



Turkish-German University
Faculty of Science
Molecular Biotechnology Department
Molecular Biotechnology (German)
Undergraduate Program Course Structure

1. Semester Course Plan					T: Theory A: Application L: Laboratory
#	Course Code	Course Name	T+A+L	Compulsory/Elective	ECTS
01-01	BIO111	Biology	2+1+2	Compulsory	6
01-02	CHE111	Chemistry I	2+1+2	Compulsory	6
01-03	DEU121	Technical German I	2+0+0	Compulsory	2
01-04	ENG101	English I	3+0+0	Compulsory	2
01-05	MAT103	Analysis I	3+2+0	Compulsory	6
01-06	NWI107	Introduction to Natural Sciences	2+0+0	Compulsory	2
01-07	PHY111	Physics I	2+1+2	Compulsory	6
Total ECTS					30

2. Semester Course Plan					
#	Course Code	Course Name	T+A+L	Compulsory/Elective	ECTS
02-01	CHE112	Chemistry II	2+1+2	Compulsory	6
02-02	DEU122	Technical German II	2+0+0	Compulsory	2
02-03	ENG102	English II	3+0+0	Compulsory	2
02-04	MAT112	Analysis II ve Linear Algebra	3+2+0	Compulsory	6
02-05	NWI102	Introduction to Programming	2+0+2	Compulsory	6
02-06	NWI106	Project Management	2+0+0	Compulsory	2
02-07	PHY112	Physics II	2+1+2	Compulsory	6
Total ECTS					30

3. Semester Course Plan					
#	Course Code	Course Name	T+A+L	Compulsory/Elective	ECTS
03-01	AIT001	Principles of Atatürk and History of Turkish Revolution I	2+0+0	Compulsory	2
03-02	ENG201	English III	3+0+0	Compulsory	2
03-03	MAT201	Differential Equations	2+2+1	Compulsory	6
03-04	MBT201	Cell Biology	3+1+1	Compulsory	6
03-05	MBT211	Biochemistry I	2+1+2	Compulsory	6
03-06	NWI201	Physical Chemistry I	3+1+1	Compulsory	6
03-07	TUR001	Turkish I	2+0+0	Compulsory	2
Total ECTS					30

4. Semester Course Plan					
#	Course Code	Course Name	T+A+L	Compulsory/Elective	ECTS
04-01	AIT002	Principles of Atatürk and History of Turkish Revolution II	2+0+0	Compulsory	2
04-02	ENG202	English IV	3+0+0	Compulsory	2
04-03	MBT202	Biophysical Chemistry	3+1+0	Compulsory	6
04-04	MBT204	Microbiology I	2+1+2	Compulsory	6
04-05	MBT212	Biochemistry II	3+0+2	Compulsory	6
04-06	MBT222	Molecular Biotechnology I	2+1+2	Compulsory	6
04-07	TUR002	Turkish II	2+0+0	Compulsory	2
Total ECTS					30

5. Semester Course Plan

#	Course Code	Course Name	T+A+L	Compulsory/Elective	ECTS
05-01	ENG341	Technical English I	2+0+0	Compulsory	2
05-02	ISG001	Occupational Safety and Health I	2+0+0	Compulsory	2
05-03	MBT323	Molecular Biotechnology II	2+1+2	Compulsory	6
05-04	SDBIOI	Elective Courses - BIO I	-	Elective	18
05-05	SDSOZI	Elective Courses - SOZ	-	Elective	2
Total ECTS					30
Elective Courses					
05-04-01	MBT361	Microbiology II	3+0+2	Elective	6
05-04-02	MBT363	Immunology	3+0+2	Elective	6
05-04-03	MBT365	Ecology	3+0+2	Elective	6
05-04-04	MBT367	Evolution	3+0+2	Elective	6
05-04-05	NWI301	Organic Chemistry for Biosciences	2+1+2	Elective	6
05-05-01	NWI321	History of Science	2+0+0	Elective	2
05-05-02	NWI323	Philosophy of Science	2+0+0	Elective	2
05-05-03	NWI325	Scientific Ethics	2+0+0	Elective	2
05-05-04	NWI401	Scientific Work	2+0+0	Elective	2
05-05-05	TUR009	Elective Academic Turkish	2+0+0	Elective	2

6. Semester Course Plan

#	Course Code	Course Name	T+A+L	Compulsory/Elective	ECTS
06-01	ENG342	Technical English II	2+0+0	Compulsory	2
06-02	ISG002	Occupational Safety and Health II	2+0+0	Compulsory	2
06-03	MBT324	Molecular Biotechnology III	2+0+2	Compulsory	5
06-04	MBT332	Process Engineering for Biotechnology I	2+1+0	Compulsory	6
06-05	NWI204	Measurement Techniques	2+1+1	Compulsory	6
06-06	NWI300	Law	3+0+0	Compulsory	3
06-07	SDBIOII	Elective Courses - BIO II	-	Elective	6
Total ECTS					30
Elective Courses					
06-07-01	MBT364	Bioanalytics	3+0+2	Elective	6
06-07-02	NWI202	Physical Chemistry II	3+1+1	Elective	6

7. Semester Course Plan

#	Course Code	Course Name	T+A+L	Compulsory/Elective	ECTS
07-01	MBT441	Project I	0+0+4	Compulsory	6
07-02	PRK401	Internship	0+0+0	Compulsory	6
07-03	SDBIOIII	Elective Courses - BIO III	-	Elective	12
07-04	SDMATI	Elective Courses - MAT I	-	Elective	6
Total ECTS					30
Elective Courses					
07-03-01	MBT433	Process Engineering for Biotechnology II	3+0+2	Elective	6
07-03-02	MBT471	Cell-Material Interactions	3+0+2	Elective	6
07-03-03	MBT473	Tissue Engineering	3+0+2	Elective	6
07-03-04	MBT475	Biosensors	3+0+2	Elective	6
07-03-05	MBT477	Nanobiotechnology	3+0+2	Elective	6
07-03-06	MBT479	Targeted Drug Delivery	3+0+2	Elective	6
07-04-01	MBT451	Bioinformatics	2+0+2	Elective	6
07-04-02	MBT453	Biomathematics	2+2+0	Elective	6
07-04-03	MBT455	Biophysics	2+2+0	Elective	6

8. Semester Course Plan

#	Course Code	Course Name	T+A+L	Compulsory/Elective	ECTS
08-01	MBT442	Project II	0+0+6	Compulsory	12
08-02	SDBIOIV	Elective Courses - BIO IV	-	Elective	12
08-03	SDMATII	Elective Courses - MAT II	-	Elective	6
Total ECTS					30
Elective Courses					
08-02-01	MBT474	Population Genetics	3+2+0	Elective	6
08-02-02	MBT476	Active Agent Research	3+0+2	Elective	6
08-02-03	MBT478	Natural Substance Research	3+0+2	Elective	6
08-02-04	MWT310	Biomaterials	3+0+2	Elective	6
08-03-01	MBT456	Quantitative Biology	2+2+0	Elective	6
08-03-02	MBT458	Biostatistics	2+2+0	Elective	6
08-03-03	NWI302	Statistics and Numerical Methods	2+2+0	Elective	6
08-03-04	NWI402	MATLAB for Biosciences	2+0+2	Elective	6



BIO111 Biology					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
1	BIO111	Biology	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

The aim is to introduce the students of all programs in the faculty of natural sciences to biology starting with the fundamental basics and covering all disciplines of biology in order to show its application possibilities in their respective field.

Teaching Methods and Techniques:

Chemical principles of biology, role of water and carbon in biology, structure and function of biological macromolecules - Biological membranes, structures of plant and animal cells and their organelles - Basic principles of metabolism, respiration and fermentation, photosynthesis - Cell cycle, mitosis and meiosis - Inheritance of traits, the gene concept, gene regulation - Viruses and genetic methods in biotechnology - Evolution and emergence of species - Introduction to plants and their physiology - Introduction to animals and their physiology

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Associate Prof.Dr. Can Murat Ünal

Assistants:

Recommended or Required Reading

Resources Biology, Neil A. Campbell /Jane B. Reece, Pearson Publishing,Biology, Purves, 2012, Jürgen Markl (ed.) Springer International Publishing

Course Category

Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	: 100
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Chemical fundamentals of life		
2	Introduction to biology and its key issues		
3	Water and life/Carbon and the molecular diversity of life		
4	Structure and function of biological macromolecules		
5	Cells and their organelles/Structure and function of biological membranes		
6	Introduction to metabolism/Cellular respiration and fermentation		
7	Photosynthesis		
8	Cell cycle, mitosis, meiosis		
9	Transmission of genetic traits/From gene to protein		
10	Regulation of gene expression.		
11	Viruses/Genetic engineering in biotechnology		
12	Evolution theory/Emergence of species		
13	Introduction to plants and plant physiology		
14	Introduction to animals and animal physiology		

Course Learning Outcomes

No	Learning Outcomes
C01	The student defines basic terms of biology.
C02	The student explains the contribution of physical and chemical principles to the field of biology.
C03	The student defines the building blocks of living organisms, the cell architecture and its organelles including their functions.
C04	The student explains the basic principles that ensure the operation of living systems on molecular, cellular, organ and organismal levels.
C05	The student defines the basic mechanisms that govern the transmission of traits and the emergence of species.
C06	The student can transfer biological principles to other fields of natural sciences.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%35
Quizzes	0	%0
Assignment	2	%15
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%50
Total		%100

Contribution of Learning Outcomes to Programme Outcomes							
bbb							
	P01	P02	P03	P04	P05	P06	P07
All	5	3		3	2		5
C01			5				
C06			5			5	



CHE111 Chemistry I					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
1	CHE111	Chemistry I	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

1.To teach the basic concepts and principles of chemistry. 2.To provide the theoretical and practical knowledge together. 3.To improve the ability of problem solving skill and to make critical decisions. 4.To give the importance of chemistry on the daily life. 5.To help the students thinking positively, logical and to understand the principles of nature.

Teaching Methods and Techniques:

Electronic Structure of Atom, Periodic Table, Chemical Compounds, Chemical Reactions, Reactions in Aqueous Solutions, Gases, Thermochemistry, Chemical Bonding -I, Chemical Bonding -II, Liquids, Solids, and Intermolecular Forces, Solutions and Their Physical Properties, Chemical Equilibrium, Acids and Bases, Thermodynamics

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Asist Prof.Dr. Sibel Özenler

Assistants:

Recommended or Required Reading

Resources R.H. Petrucci, W.S. Harwood, F.G. Herring, J.F. Madura,, 2007, General (Textbook) Chemistry, Principles and Modern Applications, Pearson Prentice Hall, ISBN:0-13-1988; General Chemistry, Principles & Modern Applications, R. H. Petrucci, W.S. Harwood, Herring, Prentice Hall International, Inc., 2002, 8th Ed. and all General Chemistry Text

Course Category			
Mathematics and Basic Sciences	:	100	
Engineering	:		Education
Engineering Design	:		Science
Social Sciences	:		Health
	:		Field

Weekly Detailed Course Contents			
Week	Topics	Study Materials	Materials
1	Properties of Matter and Electronic Structure of Atom		
2	Periodic Table and Chemical Compounds		
3	Chemical Reactions and Reactions in Aqueous Solutions		
4	Gases		
5	Thermochemistry		
6	Chemical Bonding I		
7	Chemical Bonding II		
8	Liquids, Solids and Intermolecular Forces I		
9	Liquids, Solids and Intermolecular Forces II		
10	Solutions and Their Physical Properties		
11	Chemical Equilibrium		
12	Acids and Bases		
13	Thermodynamic		
14	General Review		

Course Learning Outcomes	
No	Learning Outcomes
C01	will be able to identify and apply atomic theories and useful relationships from the periodic table,
C02	Make calculations with using stoichiometry in chemical reactions,
C03	Solve different problems about liquid solutions and gases,
C04	Make applications about heat, work, enthalpy and internal energy
C05	Set up the three dimensional shape of molecular compounds with using their chemical bonding knowledge and some other bond theories.
C06	Show the crystal structures of solids and skills to solve related problems,
C07	Solve problems about thermodynamic, chemical equilibrium, acid and base concepts and concentration
C08	. Integrate their chemistry knowledge to their daily life with the realworld examples (examples relevant to the biological sciences, engineering and the environmental sciences)

Program Learning Outcomes	
No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%40	Course Duration	14	2	28
Quizzes	0	%0	Hours for off-the-c.r.stud	5	12	60
Assignment	0	%0	Assignments	1	30	30
Attendance	0	%0	Presentation	0	0	0
Practice	0	%0	Mid-terms	1	2	2
Project	0	%0	Practice	14	2	28
Final examination	1	%60	Laboratory	0	0	0
Total		%100	Project	0	0	0
			Final examination	1	2	2
			Total Work Load			150
			ECTS Credit of the Course			5

Contribution of Learning Outcomes to Programme Outcomes								
bbb								
	P01	P02	P03	P04	P05	P06	P07	
All	2	2	2	2		2	1	
C01	2	2	3	2	1	1	1	
C02	2	2	3	2	1	1	2	
C03	2	2	3	2		1	1	
C04	2	2	3	2		1	1	
C05		2	3	2		1	1	
C06	1	2	3	2		1	1	
C07	2	2	3	2	1	1	1	
C08	1	2	2	2	2	2	2	



Turkish-German University

Faculty of Science
Molecular Biotechnology (German)

01-03

DEU121 Technical German I					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
1	DEU121	Technical German I	2	2	2

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

To introduce students to their professional terminology and improve their reading comprehension and pronunciation skills in German

Teaching Methods and Techniques:

to enable the students produce written work encompassing definition paragraphs summaries, descriptions (mechanism and process), and classification essays, maintaining unity and coherence.

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Lecturer Selahaddin Soyudoğru

Assistants:

Recommended or Required Reading

Resources	related German resources,Book: Technical German for education and business. Several learning books ,Several books in material science and know-how from internet German current scientific articles and presentations slights / sunumlar sunum / presentation 2
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Course Category

Mathematics and Basic Sciences	:	Education	:	100
Engineering	:	Science	:	
Engineering Design	:	Health	:	
Social Sciences	:	Field	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction, To get To know, which subjects we learn, learning learning	Preparing of presentation	
2	Technical words about biotechnology	Preparing of presentation	

Course Learning Outcomes

No	Learning Outcomes
C01	Physics, material science and biology students can learn approximately 350 technical words
C02	Presentations in several technical branches and improvement in presentation technique
C03	Reading and hearing during teaching, corrections, explain with videos

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		%100

	P01	P02	P03	P04	P05	P06	P07
All	1	1	1	1	1	1	2



ENG101 English I					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
1	ENG101	English I	3	3	2

Mode of Delivery:

Face to Face

Language of Instruction:

English

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

The students should have English B1 level knowledge in reading, writing, speaking and grammar.

Teaching Methods and Techniques:

Provide students with the ability to write at the basic level (to introduce themselves and others physically / introduce themselves and others as characters / write short stories / CV / e-mail / composition) • Ensure that students improve their B1 level speaking skills (verbal presentation of self and others / directions / directions

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Okutman İlknur KARADAĞLI DİRİK

Assistants:

Recommended or Required Reading

Resources Hutchinson, T. & Sherman, K. (2012). Network 3. Oxford University Press: New York

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Course Category

Mathematics and Basic Sciences	:	Education	:	100
Engineering	:	Science	:	
Engineering Design	:	Health	:	
Social Sciences	:	Field	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to the course and the course materials		
2	Welcome to school! Introducing yourself/ Asking questions/ General introduction to English		
3	Let's introduce ourselves/ Welcoming others/Personal information/Present simple and present continuous		
4	Reading and writing: Ms Medina's Spanish Class/ The fashionable milliner		
5	Things happen/ Describing unexpected events/Expressions with 'get'/ Present perfect with 'for' and 'since'		
6	Reading and writing: The 90/10 Secret/ You can do it!		
7	Describing a location/ Describing housing/ Articles		
8	Reading and writing: Sofa Surfing/ The Alhambra		
9	Midterm exams		
10	Seeing old friends/ Talking about an old friend/ Phrasal verbs/ Separable and non-separable phrasal verbs/ reading and sp		
11	Finding a lost friend/Unit 5: Congratulations!/Discussing events in the past		
12	Achievements/Present perfect and past simple/ Reading and Speaking: Want to win? Get Lin!		
13	Adventure seekers/Unit 6: Healthy Living: Planning to do something healthy/ Health and fitness/ Future/Reading and writin		
14	A healthy lifestyle/ Unit 7: What a plan!/Talking about being late/Transportation problems/Past perfect/Reading and writing		
15	A New York City Taxi Driver/ Unit 8: Eat up! Making suggestions/Describing food/ Tag questions/Reading and Writing: 46 F		

Course Learning Outcomes

No	Learning Outcomes
C01	Students will have 'B1' level of English knowledge.
C02	Students will develop their reading comprehension skills at B1 level.
C03	Students will improve their ability to understand what they listen at B1.
C04	Students will be informed at B1 level and will be able to use it effectively.
C05	Students will learn vocabulary at B1 level and use them during reading, listening and speaking.
C06	Students will improve their writing abilities at the baseline level (to promote themselves and others physically / introduce themselves and others as characters / write short stories / CV / e-mail).
C07	Students will improve their speaking skills at B1 (verbally introducing themselves / others / asking directions / making directions / telling them what they have done in a past time / describing their

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		%100

	P01	P04	P07
All	3	5	5



MAT103 Analysis I					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
1	MAT103	Analysis I	5	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

Analysis I

Teaching Methods and Techniques:

Real Numbers, Number Representations, Difference, Range Equations, Inequalities, Solution Set Coordinate Systems, True, Slope Functions, Function Graph Limit, Continuity in Functions
Difference, Increase / Decrease Rate, Tangent Derivative, Derivative Account, Function Derivative Applications of Derivative Account Integral Account, Definite and Indefinite Integral The Basic
Theory of Analysis Applications of Integral Account Infinite Series, Taylor-Series, Fourier-Series

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Associate Prof.Dr. Orkide Coskuner Weber

Assistants:

Recommended or Required Reading

Resources	Calculus: A Complete Course, Robert A. Adams, C Essex 7th Edition, Addison Wesley Longman Toronto 2010, Thomas' Calculus, 12th Edition, G.B Thomas, M.D. Weir, J. Hass Thomas' Calculus, 12th Edition, G.B Thomas, M.D. Weir, J. Hass and F.R. Giordano, Addison-Wesley, 2012
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Course Category

Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	:
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Functions: Functions and their graphs, Trigonometric functions	-	Thomas' Calculus, 12th Edition, G.B Tho
2	Limits and Continuity Rates of Change and Tangents to Curves, Limit of a Function and Limit Laws, The Sandwich (The Squ	-	Thomas' Calculus, 12th Edition, G.B Tho
3	Differentiation: Tangents, Normal Lines, The Derivative at a Point, The Derivate as a Function, Differential	-	Thomas' Calculus, 12th Edition, G.B Tho
4	Derivatives of Trigonometric Fncions, The chain rule, Implicit Differentiation, Linearization and Differentials	-	Thomas' Calculus, 12th Edition, G.B Tho
5	Applications of derivatives: Extrem Values of Functions, Critical Points, Rolle's Theorem, The Mean Value Theorem, Monotor	-	Thomas' Calculus, 12th Edition, G.B Tho
6	Concavity and Curve Sketching, The Second Derivative Test for Concavity, Point of Inflection The Second Derivative Test fc	-	Thomas' Calculus, 12th Edition, G.B Tho
7	Integration: Area and Estimating with Finite Sums, Average Value of Nonnegative Continuous Functions, Sigma Notation an	-	Thomas' Calculus, 12th Edition, G.B Tho
8	(Quizexam) Mean Value Theorem fo Definite Integrals, The Fundamental Theorem of Calculus: Fundamental Theorem Part	-	Thomas' Calculus, 12th Edition, G.B Tho

Course Learning Outcomes

No	Learning Outcomes
C01	Understands the basic concepts of analysis: - The definition of the derivative as the "rate of change" and the limit of the ratio of the differences calculation, - Definition of the integral as infinite "To
C02	You can analyze the properties and behaviors of the functions and the function graph (asymptotes, critical points, with the help of derivative tests for slope and curvature).
C03	The derivative account can be used to solve problems in the field of application (eg. Optimization, linked rates).
C04	Integral calculation of curve length, volume and area calculation and application area can be used to solve other problems.
C05	Certain and indefinite Integrals can be solved using various integration methods.
C06	He can examine convergence behavior of improper integrals, convergent has non-integrals.
C07	One can detect convergence / divergence of infinite series
C08	One can calculate Taylor expansion around a point for a function.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.



NW1107 Introduction to Natural Sciences					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
1	NW1107	Introduction to Natural Sciences	2	2	2

Mode of Delivery:

Face to Face

Language of Instruction:

Deutsch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

The students; • Have a first overview of the field of materials science, molecular biotechnology and energy sciences.

Teaching Methods and Techniques:

Introduction to the "world of materials", crystals: structure and properties, structure, properties and applications of metallic materials, structure, properties and applications of oxidic materials, materials of electrical engineering and microelectronics, material applications in mechanical engineering, optical properties of new materials plastics

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Dr. Rafet İşler

Assistants:

Recommended or Required Reading

Resources	Handouts
	Handouts

Course Category

Mathematics and Basic Sciences	:		Education	:	
Engineering	:	20	Science	:	60
Engineering Design	:		Health	:	
Social Sciences	:		Field	:	20

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Research areas and methods of energy sciences and technologies I.		
2	Research areas and methods of energy sciences and technologies II.		
3	Research areas and methods of energy sciences and technologies III.		
4	Research areas and methods of material sciences and technologies I.		
5	Research areas and methods of material sciences and technologies II.		
6	Research areas and methods of material sciences and technologies III.		
7	Research areas and methods of molecular biotechnology I.		
8	Research areas and methods of molecular biotechnology II.		
9	Research areas and methods of molecular biotechnology III.		

Course Learning Outcomes

No	Learning Outcomes
C01	Students gain understanding about the research areas and methods in Energy Science and Technologies, Materials Science and Technologies and Molecular Biotechnology.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		%100

Contribution of Learning Outcomes to Programme Outcomes						
bbb						
	P01	P02	P03	P04	P07	
All	5	5	2	5	3	
C01	5	5	2	5		



PHY111 Physics I					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
1	PHY111	Physics I	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

Understanding of fundamental concepts of classical mechanics to build a basis for upcoming courses. Motion in one, two and three dimensions. Application of Newton's Laws and energy conservation laws to dynamical systems and

Teaching Methods and Techniques:

Vectors, Motion in one, two and three Dimensions, Circular Motion, Newton's Laws, Work, Kinetic Energy, Potential Energy, Conservation of Energy, Momentum and its Conservation, Elastic and inelastic Collisions, Torque and Moment of Inertia, Motion of rigid Bodies, Harmonic Oscillations

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Asist Prof.Dr. Neşe Aral

Assistants:

Recommended or Required Reading

Resources Gerthsen Physik; Dieter Meschede, Springer, 2015

Course Category					
Mathematics and Basic Sciences	:	60	Education	:	
Engineering	:	40	Science	:	
Engineering Design	:		Health	:	
Social Sciences	:		Field	:	

Weekly Detailed Course Contents			
Week	Topics	Study Materials	Materials
1	Physical Quantities, SI Unit System		
2	Dimensional Analysis		
3	Vectors, Velocity, Acceleration		
4	One dimensional motion, free fall		
5	Motion in two and three dimensions, projectile and circular motion		
6	Newton's Laws		
7	Work, Power, Kinetic Energy		
8	Motion in a force field		
9	Potential Energy, Conservation of Energy		
10	Momentum and Conservation of Momentum, Elastic and inelastic Collisions		
11	Torque, Moment of Inertia		
12	Moments of Inertia of Solid Bodies		
13	Motion of Rigid Bodies		
14	Harmonic Oscillations		

Course Learning Outcomes	
No	Learning Outcomes
C01	Working with Vectors
C02	Definition of equations of motion in one, two and three dimensions and being able to solve and analyze them
C03	Application of Newton's laws to dynamical systems
C04	Connection of ideas of work and energy, solving mechanical problems with the help of conservation of energy

Program Learning Outcomes	
No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%20	Course Duration	45	1	45
Quizzes	2	%20	Hours for off-the-c.r.stud	14	5	70
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	5	%20	Mid-terms	1	3	3
Project	0	%0	Practice	10	5	50
Final examination	1	%40	Laboratory	5	2	10
Total		%100	Project	0	0	0
			Final examination	1	3	3
			Total Work Load			181
			ECTS Credit of the Course			6

Contribution of Learning Outcomes to Programme Outcomes				
bbb				
	P01	P02	P03	
C01	5			5
C02	5			5
C03	5	5		5
C04	5			5



CHE112 Chemistry II					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
2	CHE112	Chemistry II	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

Students acquire the basic knowledge of organic chemistry. They have a good understanding of the common classes of substances, the linking of structure, binding and the classification of organic compounds. Here, in addition to a deeper understanding of the chemical principles, a good understanding of the standard organic-chemical reactions with mechanistic details, the influence of the framework conditions in an organic-chemical reaction and the most important analytical methods (eg mass spectrometry, IR and NMR spectroscopy) should be developed

Teaching Methods and Techniques:

Structure and Binding of Organic Molecules, Structure and Reactivity: Introduction to Organic Molecule Reactions: Kinetics, Acidity / Basicity and Mechanisms, Functional Groups, Alkanes and Their Reactions, Nomenclature and Stereochemistry, Alcohols and Ethers and Their Reactions, Alkenes and Haloalkanes, Mass Spectrometry, IR and NMR spectroscopy for structure elucidation, alkynes and their reactions, aromatics and their reactions, reactions of carbonyl compounds, aldehydes, ketones and carboxylic acids, amines and thiols, carbohydrates, amino acids, peptides and proteins

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Asist Prof.Dr. Duygu Ekinici

Assistants:

Recommended or Required Reading

Resources	
	K.P.C. Vollhardt, N.E. Schore, K. Peter. "Organische Chemie"
1.	K.P.C. Vollhardt, N.E. Schore, K. Peter. "Organische Chemie"
2.	N.E. Schore. "Arbeitsbuch Organische Chemie"
3.	H.G.O Becker et al. "Organikum"
4.	R. Brückner "Reaktionsmechanismen"
5.	M. Hesse, H. Meier, B. Zeeh. "Spektroskopische Methoden in der organischen Chemie"

Course Category

Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	: 100
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Atoms, molecules, bonding, polar and nonpolar molecules, intermolecular forces, solubilities, Lewis structures, resonance, i		
2	Introduction to orbitals, molecular orbital description of bonding, hybridization, structure of methane		
3	Alkanes- conformational analysis, structural isomerism and nomenclature, alkyl groups		
4	Alkenes- structure and bonding, nomenclature, E-Z notation, hydrogenation, relative stabilities.		
5	Stereochemistry		
6	Ring systems		
7	Alkyl halides, substitution reactions of alkyl halides- SN 2 and SN 1 mechanisms. Elimination reactions- E1 and E2 mechanis		
8	Overview of substitution and elimination reactions, oxidation of alcohols, rates and equilibria, syntheses		

Course Learning Outcomes

No Learning Outcomes

C01 basic principles of organic chemistry, organic molecular bonding, properties and reactivity; properties and behavior of organic compounds. Understanding organic synthesis and mechanisms

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%30	Course Duration	15	2	30
Quizzes	0	%0	Hours for off-the-c.r.stud	15	5	75
Assignment	0	%0	Assignments	10	4	40
Attendance	0	%0	Presentation	0	0	0
Practice	0	%30	Mid-terms	1	2	2
Project	0	%0	Practice	15	1	15
Final examination	1	%40	Laboratory	10	2	20
Total		%100	Project	0	0	0
			Final examination	1	2	2
			Total Work Load			184
			ECTS Credit of the Course			6

Contribution of Learning Outcomes to Programme Outcomes					
bbb					
	P01	P02	P03	P06	
All	3	3	3	3	



Turkish-German University

Faculty of Science
Molecular Biotechnology (German)

02-02

DEU122 Technical German II					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
2	DEU122	Technical German II	2	2	2

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

To introduce students to their professional terminology and improve their reading comprehension and pronunciation skills in German

Teaching Methods and Techniques:

to enable the students produce written work encompassing definition paragraphs summaries, descriptions (mechanism and process), and classification essays, maintaining unity and coherence.

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Lecturer Selahaddin Soyudođru

Assistants:

Recommended or Required Reading

Resources	related German resources,Book: Technical German for education and business. Several learning books ,Several books in material science and know-how from internet German current scientific articles and presentations slides / sunumlar sunum / presentation 2
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Course Category

Mathematics and Basic Sciences	:	Education	:	100
Engineering	:	Science	:	
Engineering Design	:	Health	:	
Social Sciences	:	Field	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction, To get To know, which subjects we learn, learning learning	Preparing of presentation	
2	Technical words biotechnology	Preparing of presentation	

Course Learning Outcomes

No	Learning Outcomes
C01	Physics, material science and biology students can learn approximately 350 technical words
C02	Presentations in several technical branches and improvement in presentation technique
C03	Reading and hearing during teaching, corrections, explain with videos

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		%100

	P01	P02	P03	P04	P05	P06	P07
All	3	3	4	5	4	5	5



ENG102 English II					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
2	ENG102	English II	3	3	2

Mode of Delivery:

Face to Face

Language of Instruction:

English

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

The Students should have english B1 level knowledge in reading, writing, speaking and grammar.

Teaching Methods and Techniques:

Provide students with the ability to write at the basic level (to introduce themselves and others physically / introduce themselves and others as characters / write short stories / CV / e-mail / composition) • Ensure that students improve their B1 level speaking skills (verbal presentation of self and others / directions / directions

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Okutman İlknur KARADAĞLI DİRİK

Assistants:

Recommended or Required Reading

Resources Hutchinson, T. & Sherman, K. (2012). Network 3. Oxford University Press: New York

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Course Category

Mathematics and Basic Sciences	:	Education	:	100
Engineering	:	Science	:	
Engineering Design	:	Health	:	
Social Sciences	:	Field	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to the course and the course materials		
2	Welcome to school! Introducing yourself/ Asking questions/ General introduction to English		
3	Let's introduce ourselves/ Welcoming others/Personal information/Present simple and present continuous		
4	Reading and writing: Ms Medina's Spanish Class/ The fashionable milliner		
5	Things happen/ Describing unexpected events/Expressions with 'get'/ Present perfect with 'for' and 'since'		
6	Reading and writing: The 90/10 Secret/ You can do it!		
7	Describing a location/ Describing housing/ Articles		
8	Reading and writing: Sofa Surfing/ The Alhambra		
9	Midterm exams		
10	Seeing old friends/ Talking about an old friend/ Phrasal verbs/ Separable and non-separable phrasal verbs/ reading and sp		
11	Finding a lost friend/Unit 5: Congratulations!/Discussing events in the past		
12	Achievements/Present perfect and past simple/ Reading and Speaking: Want to win? Get Lin!		
13	Adventure seekers/Unit 6: Healthy Living: Planning to do something healthy/ Health and fitness/ Future/Reading and writin		
14	A healthy lifestyle/ Unit 7: What a plan!/Talking about being late/Transportation problems/Past perfect/Reading and writing		
15	A New York City Taxi Driver/ Unit 8: Eat up! Making suggestions/Describing food/ Tag questions/Reading and Writing: 46 F		

Course Learning Outcomes

No	Learning Outcomes
C01	Students will have 'B1' level of English knowledge.
C02	Students will develop their reading comprehension skills at B1 level.
C03	Students will improve their ability to understand what they listen at B1.
C04	Students will be informed at B1 level and will be able to use it effectively.
C05	Students will learn vocabulary at B1 level and use them during reading, listening and speaking.
C06	Students will improve their writing abilities at the baseline level (to promote themselves and others physically / introduce themselves and others as characters / write short stories / CV / e-mail).
C07	Students will improve their speaking skills at B1 (verbally introducing themselves / others / asking directions / making directions / telling them what they have done in a past time / describing their

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		%100

	P01	P04	P07
All	3	5	5

MAT112 Analysis II and Linear Algebra					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
2	MAT112	Analysis II and Linear Algebra	5	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

To make students use matrices, partial derivative and integral concepts in multivariable functions, to gain ability to use mathematics knowledge to solve scientific problems

Teaching Methods and Techniques:

Vectors, Real Matrices, Determinants, Linear Equation Systems, Gauss Algorithm, Linear Functions, Complex Matrices, Fourier Series, Multidimensional Derivatives and Integrals, Ordinary and Multidimensional Integrals, Laplace Transformation

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Asist. Prof. Dr. Neşe Aral

Assistants:

Recommended or Required Reading

Resources	- Şanal Ziya, Mathematik für Ingenieure, Vieweg+Teubner, Wiesbaden 2009 - Papula Lothar, Mathematik für Ingenieure und Naturwissenschaftler, Band 1+2, Wiesbaden References Şanal Ziya, Mathematik für Ingenieure, Vieweg+Teubner, Wiesbaden 2009 Papula Lothar, Mathematik für Ingenieure und Naturwissenschaftler, Band 1+2, Wiesbaden 2011 Skriptum „Analysis I für Ingenieure“, Prof. Dr. Dirk Ferus - Skriptum „Analysis II für Ingenieure“, Prof. Dr. Dirk Ferus
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Course Category

Mathematics and Basic Sciences	:	100	Education	:	
Engineering	:		Science	:	
Engineering Design	:		Health	:	
Social Sciences	:		Field	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Matrices and Systems of Equations		
2	Matrices and Systems of Equations		
3	Matrices and Systems of Equations		
4	Determinants		
5	Determinants / Vector Space		
6	Vector Space		
7	Vector Space		
8	Midterm		
9	Vector Space / Linear Transformations		
10	Linear Transformations		
11	Eigenvalues		
12	Eigenvalues / Orthogonality		
13	Orthogonality		
14	Orthogonality		

Course Learning Outcomes

No	Learning Outcomes
C01	Solve the systems of linear equations. Provide arithmetic operations with matrices. Compute the inverse of matrix.
C02	Determine the value of determinant of a matrix. Use Cramer rule to solve the systems.
C03	Learn the importance of the concepts of vector space, basis and dimension.
C04	Compute the matrix representation of a linear transformation.
C05	Find an orthonormal basis using the Gram-Schmidt process.
C06	Evaluate the eigenvalues and the corresponding eigenvectors of the matrix.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	2	%60	Course Duration	14	4	56
Quizzes	0	%0	Hours for off-the-c.r.stud	14	4	56
Assignment	0	%0	Assignments	14	3	42
Attendance	0	%0	Presentation	0	0	0
Practice	0	%0	Mid-terms	2	8	16
Project	0	%0	Practice	14	2	28
Final examination	1	%40	Laboratory	0	0	0
Total		%100	Project	0	0	0
			Final examination	1	4	4
			Total Work Load			202
			ECTS Credit of the Course			7

Contribution of Learning Outcomes to Programme Outcomes							
bbb							
	P01	P02	P03	P04	P05	P06	P07
All	5	5	5	5	5	5	5



NW1102 Introduction to Programming					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
2	NW1102	Introduction to Programming	2	4	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutsch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

- Understanding the structure, functionality and application of computer systems and computer networks • Practical handling of computers and their interfaces • Fundamentals of PLC and microcontroller programming Knowledge of the applicability for engineering tasks

Teaching Methods and Techniques:

Computational Information Representation, Boolean Algebra, Matlab - Simulink, Computer Architecture, Operating Systems, Programming Languages (Java and C ++), Computer Networks, Algorithms, Unified Modeling Language, Databases, PLC Programming, IT Security, Microcontrollers

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Associate Prof.Dr. Şahin Uyaver

Assistants:

Recommended or Required Reading

Resources	
	Algorithmik: Die Kunst des Rechnens, David Harel, Springer, Deutschland, 2006 (Orjinal: Algorithmics: The Spirit of Computing, David Harel, Addison-Wesley, Great Britain)
	• Einführung in die Informatik, Heinz-Peter Gumm, Oldenbourg Wissenschaftsverlag, München, 2013.
	• Algorithmik: Die Kunst des Rechnens, David Harel, Springer, Deutschland, 2006 (Orjinal: Algorithmics: The Spirit of Computing, David Harel, Addison-Wesley)

Course Category

Mathematics and Basic Sciences	: 40	Education	:
Engineering	: 40	Science	: 20
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	How does a computer think? How to interact with it? How does it work?		
2	Introduction to data types and structures, logical operators, functions, data analysis		
3	package management, code profiling and optimization.		

Course Learning Outcomes

No	Learning Outcomes
C01	Understanding the structure, functionality and application of computer systems and computer networks

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%40	Course Duration	15	2	30
Quizzes	0	%0	Hours for off-the-c.r.stud	15	3	45
Assignment	0	%0	Assignments	5	15	75
Attendance	0	%0	Presentation	0	0	0
Practice	0	%0	Mid-terms	1	2	2
Project	0	%0	Practice	0	0	0
Final examination	1	%60	Laboratory	15	2	30
Total		%100	Project	0	0	0
			Final examination	1	2	2
			Total Work Load			184
			ECTS Credit of the Course			6

Contribution of Learning Outcomes to Programme Outcomes			
bbb			
	P04	P06	
C01	3	2	



Project Management					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
2	NWI106	Project Management	2	2	2

Mode of Delivery:

Face to Face

Language of Instruction:

Deutsch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

Students can learn how to begin with a new project, their organisation and planing, controlling and finishing

Teaching Methods and Techniques:

Basic information, organisation of a project, planing and controlling

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Asist. Prof. Dr. Meltem Karaismailoğlu

Assistants:

Recommended or Required Reading

Resources	Projectmanager: Schelle, Heinz / Ottmann, Roland / Pfeiffer, Astrid, Projectmanagement: Guideline for Planing, Supervising and Controlling from Projectprogress. Burghard
	<ul style="list-style-type: none"> Handbook of Project Management: J. Kuster, E. Huber, R. Lippman, A. Schmid, E. Schneider, U. Witschi, R. Wüst Projektmanagement,
	Leitfaden für die Planung, Überwachung und Steuerung von Entwicklungsprojekten.
	slides / sunum

Course Category

Mathematics and Basic Sciences	: 40	Education	:
Engineering	: 40	Science	: 20
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction, Basic Information	Preparing of presentation	Own notes, Several hand books
2	Introduction, Basic Information	Preparing of presentation	Own notes, Several hand books
3	Introduction, Basic Information	Preparing of presentation	Own notes, Several hand books
4	Project organisation and planing	Preparing of presentation	Own notes, Several hand books
5	Project organisation and planing	Preparing of presentation	Own notes, Several hand books
6	Project organisation and planing	Preparing of presentation	Own notes, Several hand books
7	Project Management	Preparing of presentation	Own notes, Several hand books
8	Project Management	Preparing of presentation	Own notes, Several hand books
9	Project Management	Preparing of presentation	Own notes, Several hand books
10	Project Management	Preparing of presentation	Own notes, Several hand books
11	Project Management	Preparing of presentation	Own notes, Several hand books
12	Phases of a project	Preparing of presentation	Own notes, Several hand books
13	Phases of a project	Preparing of presentation	Own notes, Several hand books
14	Project control and finishing	Preparing of presentation	Own notes, Several hand books

Course Learning Outcomes

No	Learning Outcomes
C01	How to begin with a project
C02	What are the methodologies and a systematical improvement of a project?
C03	Finding the risks of a project
C04	Finalizing of project

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%40	Course Duration	14	2	28
Quizzes	0	%0	Hours for off-the-c.r.stud	14	2	28
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	1	2	2
Practice	0	%0	Mid-terms	1	2	2
Project	0	%0	Practice	0	0	0
Final examination	1	%60	Laboratory	0	0	0
Total		%100	Project	0	0	0
			Final examination	1	2	2
			Total Work Load			62
			ECTS Credit of the Course			2

Contribution of Learning Outcomes to Programme Outcomes								
bbb								
	P01	P02	P03	P04	P05	P06	P07	
All	5	4	5	4	5	5	5	



PHY112 Physics II					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
2	PHY112	Physics II	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

The students have gained knowledge and understanding of the most important phenomena of electrodynamics and optics and can explain and interpret them. They can transfer the knowledge to related phenomena and bring it into connection with everyday and current phenomena. The students are also familiar with the methods of experimental physics and relevant mathematical tools and can use them to solve scientific questions.

Teaching Methods and Techniques:

Electrostatics (field, flux, potential, Gaussian theorem, capacity), currents (resistance, Ohm's law, Kirchhoff's rules), magnetostatics (Lorentz force, Amperes law), electrostatics and magnetostatics in the medium (dielectricity, diamond agitation, paramagnetism), induction and alternating currents (Faraday's law of induction, resonant circuits, complex resistors), electromagnetic fields and Maxwell's equations (Hertzian dipole, electromagnetic waves), electrical conduction processes (liquids, gases, solids), geometric optics, optical instruments (refraction law, lens equation), wave optics (interference, diffraction), Dispersion, polarization, coherence

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Asist. Prof. Dr. Neşe Aral

Assistants:

Recommended or Required Reading

Resources	Demtröder, Wolfgang: Experimentalphysik 2: Elektrodynamik und Optik, Springer
	• Demtröder, Wolfgang: Experimentalphysik 2: Elektrodynamik und Optik, Springer
	• Meschede, Dieter: Gerthsen Physik, Springer
	• Staudt, Günter: Experimentalphysik, Teil 2, Wiley-VCH

Course Category

Mathematics and Basic Sciences	: 80	Education	:
Engineering	: 10	Science	: 10
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Electrical charge, electrostatics		
2	Coulomb's Law, Electrical Field		
3	Gauss Law		
4	Voltage, Electric potential		
5	Capacitors, Dielectrics		
6	Electrical current, resistors, Ohm's Law, Electromotive force		
7	Direct current circuits, Kirchhoff's Law		
8	Magnetic field, Magnetic Forces		
9	Sources of magnetic field		
10	Electromagnetic induction, Faraday's Law		
11	Inductivity		
12	Alternating current circuits (RLC)		
13	Electromagnetic waves		

Recommended Optional Programme Components

PHY111 Physics I

MAT103 Analysis I

Course Learning Outcomes

No	Learning Outcomes
C01	Having a theoretical understanding of electric and magnetic fields and being able to solve practical problems.
C02	Being able to model and solve problems in engineering and advanced physics applications.
C03	Being able to find relations of electric and magnetic field concepts with other science disciplines and with the environment.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	2	%10
Assignment	2	%10
Attendance	0	%0
Practice	0	%20
Project	0	%0
Final examination	1	%40
Total		%100

Contribution of Learning Outcomes to Programme Outcomes					
bbb					
	P01	P02	P04	P06	
All	5	5	4	5	
C01	5	5	4	5	
C02	5	5	4	5	
C03	5	5	4	5	



Turkish-German University

Faculty of Science
Molecular Biotechnology (German)

03-01

AIT001 Principles of Atatürk and History of Turkish Revolution I					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
3	AIT001	Principles of Atatürk and History of Turkish Revolution I	2	2	2

Mode of Delivery:

Face to Face

Language of Instruction:

Turkish

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

To inform students about essential political, economic, social and cultural facts of the historical period from the late eighteenth century through the signing of Lausanne Treaty in 1923; in other words, to inform them about the background of these facts in the course of the transition from the Ottoman Empire to the establishment of republican Turkey. To provide students with some examples of a multi-layered point in order to make them able to approach historical events in a multi-dimensional way. To introduce to students certain basic theoretical concepts, discussions and methods of thought of different social sciences, with a particular emphasis on history.

Teaching Methods and Techniques:

Basic political, economic, social and cultural facts of the historical period beginning by the classical age of the Ottoman Empire and ending by the signing of Lausanne Treaty in 1923 - the fundamental academic interpretations on them.

Prerequisites and co-requisites:**Course Coordinator:****Name of Lecturers:**

Dr. Esra Eren

Assistants:**Recommended or Required Reading****Resources**

Derleme Ders Notu / Syllabus Eric Hobsbawm, "Kuşbakışı 20. Yüzyıl", Kısa 20 Yüzyıl: Asırlıklar Çağı içinde , s. 13-31 Cemil Koçak, "Siyasal Tarih: 1923-1950", Çağdaş Türk Derleme Ders Notu / Syllabus Georg Iggers, "Giriş", Yirminci Yüzyılda Tarih yazımı içinde, s. 1-21 Donald Quateert, "Osmanlı Tarihini incelemek Neden Gerekli ? ", Osmar

Course Category

Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	:
Engineering Design	:	Health	:
Social Sciences	: 100	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction: The Possibilities and the limitations of history: basic concepts		
2	Social and Administrative Structure of the Ottoman State, before the attempts of modernization: From 16th to the 18th Century		
3	Transformation in the Social and Administrative Structure of the Ottoman State, before the attempts of modernization: 18th Century		
4	The meaning of the modernization and the formation of the modern state		
5	The Tanzimat Era (1839-1876): The Reconstruction of the centralized state		
6	The Era of Abdülhamid II (1876-1908): Defensive Modernization		
7	The Era of Second Constitutional Monarchy : A Constitutional Revolution		
8	MIDTERM		
9	The Era of Second Constitutional Monarchy: Pluralism in the Public Sphere		
10	The First World War: "Total War" and the rise of the nationalism		
11	The General Social and Political Situation in the world and in the Ottoman State after the First World War		
12	The War of Independence I: The Political Developments		
13	The War of Independence I: The Military Developments		
14	The Formation and the Contents of the Lausanne Treaty		

Course Learning Outcomes

No	Learning Outcomes
C01	The students will learn meaning and benefits of historical researches.
C02	The students will learn the pre-modern Ottoman history in general.
C03	The students will be able to evaluate Ottoman history within the European modernization process.
C04	The students will be able to evaluate 19.th century Ottoman history within the context of reform efforts.
C05	The students will understand and evaluate today in relation to the history of Ottoman Empire and modern Turkey.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%40	Course Duration	14	2	28
Quizzes	0	%0	Hours for off-the-c.r.stud	14	2	28
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	0	%0	Mid-terms	1	2	2
Project	0	%0	Practice	0	0	0
Final examination	1	%60	Laboratory	0	0	0
Total		%100	Project	0	0	0
			Final examination	1	2	2
			Total Work Load			60
			ECTS Credit of the Course			2

Contribution of Learning Outcomes to Programme Outcomes							
bbb							
	P01	P02	P03	P04	P05	P06	P07
C01	1	1	1	2	2	2	4
C02	1	1	1	2	2	2	4
C03	1	1	1	2	2	2	4
C04	1	1	1	2	2	2	4
C05	1	1	1	2	2	2	4



ENG201 English III					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
3	ENG201	English III	3	3	2

Mode of Delivery:

Face to Face

Language of Instruction:

English

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

The Students should have english B2 level knowledge in reading, writing, speaking and grammar.

Teaching Methods and Techniques:

Provide students with the ability to write at the basic level (to introduce themselves and others physically / introduce themselves and others as characters / write short stories / CV / e-mail / composition) • Ensure that students improve their B1 level speaking skills (verbal presentation of self and others / directions / directions

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Okutman İlknur KARADAĞLI DİRİK

Assistants:

Recommended or Required Reading

Resources Hutchinson, T. & Sherman, K. (2012). Network 3. Oxford University Press: New York

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2

Course Category

Mathematics and Basic Sciences	:	Education	:	100
Engineering	:	Science	:	
Engineering Design	:	Health	:	
Social Sciences	:	Field	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to the course and the course materials		
2	Welcome to school! Introducing yourself/ Asking questions/ General introduction to English		
3	Let's introduce ourselves/ Welcoming others/Personal information/Present simple and present continuous		
4	Reading and writing: Ms Medina's Spanish Class/ The fashionable milliner		
5	Things happen/ Describing unexpected events/Expressions with 'get'/ Present perfect with 'for' and 'since'		
6	Reding and writing: The 90/10 Secret/ You can do it!		
7	Describing a location/ Describing housing/ Articles		
8	Reading and writing: Sofa Surfing/ The Alhambra		
9	Midterm exams		
10	Seeing old friends/ Talking about an old friend/ Phrasal verbs/ Separable and non-separable phrasal verbs/ reading and sp		
11	Finding a lost friend/Unit 5: Congratulations!/Discussing events in the past		
12	Acheivements/Present perfect and past simple/ Reading and Speaking: Want to win? Get Lin!		
13	Adventure seekers/Unit 6: Healthy Living: Planning to do something healthy/ Health and fitness/ Future/Reading and writir		
14	A healthy lifestyle/ Unit 7: What a pian!/Talking about being late/Transportation problems/Past perfect/Reading and writing		
15	A New York City Taxi Driver/ Unit 8: Eat up! Making suggestions/Describing food/ Tag questions/Reading and Writing: 46 F		

Course Learning Outcomes

No	Learning Outcomes
C01	Students will have 'B1' level of English knowledge.
C02	Students will develop their reading comprehension skills at B1 level.
C03	Students will improve their ability to understand what they listen at B1.
C04	Students will be informed at B1 level and will be able to use it effectively.
C05	Students will learn vocabulary at B1 level and use them during reading, listening and speaking.
C06	Students will improve their writing abilities at the baseline level (to promote themselves and others physically / introduce themselves and others as characters / write short stories / CV / e-mail).
C07	Students will improve their speaking skills at B1 (verbally introducing themselves / others / asking directions / making directions / telling them what they have done in a past time / describing their

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		%100



MAT201 Differential Equations					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
3	MAT201	Differential Equations	4	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutsch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

The students should • understand the essential mathematical concepts of differential equations • have the methodical foundations for the mathematical foundation of natural and engineering sciences, • have a sound knowledge of scientific and mathematical content, principles and methods, • Master basic concepts and techniques and apply them to various (physical) problems. Knowledge & Understanding: 70% Analysis & Methodology: 30%

Teaching Methods and Techniques:

• Differential equations 1st order • Linear differential equations of 2nd order, in particular with constant coefficients • Separation solutions • Integrating factor • indefinite coefficients and variation of the constants, • sinusoidal and exponential disturbance functions, • Nonlinear autonomous systems, critical points and phase diagrams • existence and uniqueness, stability • modeling • Numerical and graphical solution methods • systems of linear differential equations; Eigenvalues, eigenvectors, fundamental matrices • Laplace transformation, solution of the linear differential equations with Laplace transformation • Delta function, convolution.

Prerequisites and co-requisites:**Course Coordinator:****Name of Lecturers:**

Asist. Prof. Dr. Neşe Aral

Assistants:**Recommended or Required Reading**

Resources • P. Furlan, Das Gelbe Rechenbuch 3 • Skriptum „Integraltransformationen und partielle Differentialgleichungen für Ingenieure“, Prof. Dr. Dirk Ferus •

Course Category

Mathematics and Basic Sciences	: 100	Education	:
Engineering	:	Science	:
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Intro		
2	1. order DE		
3	2. Order, const. coeff. LDE		
4	Separation of variables		
5	Integrating factor		
6	undetermined coeff and variation of constants	Unbestimmte Koeffizienten und Variation der Konstanten	
7	Sine and exponential forcing functions		
8	Nonlinear Autonomous Systems, Critical Points and Phase Diagrams		
9	Existence and uniqueness, stability		
10	Modeling		
11	Numerical and graphical solutions		
12	System of LDEs		
13	Eigenvalues, eigenvectors, fundamental matrices		
14	Laplace transformation, solution of the linear differential equations with Laplace transformation		

Course Learning Outcomes**No Learning Outcomes**

C01	Model a simple, physical system in the form of a first-degree DE.
C02	To test the plausibility of a solution of a DE (analyzing extreme cases, graphic analysis, reality check, control of units ...).
C03	Visualize solutions of a DE using directional fields and approximate them using the Eulerian method.
C04	Find and classify critical points of an autonomous DE, and describe with them the qualitative behavior of the solutions.
C05	Know basic types of DEs and use them to model exponential growth / decay, spring-mass systems, LRC circuits, etc.
C06	Solve DEs with different interfering functions (zero, constant, exponential, sinusoidal, step function, impulse, superpositions of these).
C07	Understand and use the following properties of linear systems: Solution, Stability, Transient, Steady State, Phase Response, Amplitude Response, Amplitude Phase Shape, Weight and Transfer Function.
C08	Use the following techniques to solve DEs: characteristic equation, exponential response formula, laplace transformation, convolution integral, Fourier series, complex arithmetic, parameter variation.
C09	Know the basic concepts of linearity, superposition, existence, and uniqueness of solutions and use them to solve DEs.

Program Learning Outcomes**No Learning Outcome**

P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%30	Course Duration	28	1	28
Quizzes	0	%0	Hours for off-the-c.r.stud	60	1	60
Assignment	1	%10	Assignments	1	8	8
Attendance	0	%0	Presentation	0	0	0
Practice	1	%10	Mid-terms	1	2	2
Project	0	%0	Practice	28	1	28
Final examination	1	%50	Laboratory	14	1	14
Total		%100	Project	0	0	0
			Final examination	1	2	2
			Total Work Load			142
			ECTS Credit of the Course			5

Contribution of Learning Outcomes to Programme Outcomes								
bbb								
	P01	P02	P03	P04	P05	P06	P07	
All	5	5	5	5	5	5	5	
C01	5							
C02	5							
C03	5							
C04	5							
C05	5							
C06	5							
C07	5							
C08	5							
C09	5							



MBT201 Cell Biology					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
3	MBT201	Cell Biology	4	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

Gaining basic knowledge about the structure and mechanism of animal and plant cells.

Teaching Methods and Techniques:

Cell organelles and their organization. Mitosis and meiosis for the transfer of genetic information. Protein synthesis and gene regulation and their applications to biotechnology.

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Associate Prof.Dr. Can Murat Ünal

Assistants:

Recommended or Required Reading

Resources Bruce Alberts, Molekulare Biologie der Zelle, 6. Auflage April 2017

Course Category

Mathematics and Basic Sciences	:		Education	:	
Engineering	:	20	Science	:	80
Engineering Design	:		Health	:	
Social Sciences	:		Field	:	100

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Eukaryotes and their organelles.		
2	Prokaryotes		
3	Structure of cell membrane		
4	Mitochondria and energy production		
5	Storage of genetic information in the cell		
6	Cell division through mitosis		
7	Cell division through meiosis		
8	Protein synthesis		
9	Protein structures		
10	Gene regulation		
11	Applications of protein synthesis and gene regulation in biotechnology.		

Recommended Optional Programme Components

BIO111 Biology

Course Learning Outcomes

No	Learning Outcomes
C01	Understanding of the underlying structure and mechanism of animal and plant cells.
C02	Understanding of gene transfer mechanism through mitosis and meiosis.
C03	Understanding of applications of protein synthesis and gene regulation in biotechnology.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	1	%40
Final examination	1	%40
Total		%100

	P01	P02	P03	P04	P06
All	5	5	5	5	3
C01	5	5	5	5	3
C02	5	5	5	5	3
C03	5	5	5	5	3



MBT211 Biochemistry I					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
3	MBT211	Biochemistry I	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

Students gain knowledge about molecular mechanisms of living systems.

Teaching Methods and Techniques:

Basic structural elements of cells. Biochemical reactions. Membrane, transport and motorproteins. Signal transduction. Coordination of organ systems through hormones.

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Dr. Orkide Coşkun Weber

Assistants:

Recommended or Required Reading

Resources

Molecular Cell Biology, 4th editionHarvey Lodish, Arnold Berk, S Lawrence Zipursky, Paul Matsudaira, David Baltimore, and James Darnell.
Molecular Cell Biology, 4th editionHarvey Lodish, Arnold Berk, S Lawrence Zipursky, Paul Matsudaira, David Baltimore, and James Darnell.

Course Category

Mathematics and Basic Sciences	:	Education	:	
Engineering	:	Science	:	100
Engineering Design	:	Health	:	
Social Sciences	:	Field	:	100

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Basic elements of life, water as solvent, regulation of pH value in biological systems		
2	Carbonbinding, functional groups in biomolecules.		
3	Aminoacids, peptids ans protein structure		
4	Structure and function of nucleotides		
5	Structure of sugars		
6	Cell metabolism		
7	Cell membrane structure and proteins		
8	Cell membrane transport and ion pumps		
9	Cellular compartments and their functions		
10	Cytoskeleton, motorproteins and cell motion		
11	Signal transduction		
12	Coordination of organ functions through hormones		

Recommended Optional Programme Components

BIO111 Biology

Course Learning Outcomes

No	Learning Outcomes
C01	Understanding of basic principles of biochemistry and the functions and structures of biochemical molecules.
C02	Understanding the relation between structure and function in biomolecules.
C03	Understanding of applications of biochemical processes in biotechnology.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	1	%40
Final examination	1	%40
Total		%100

Contribution of Learning Outcomes to Programme Outcomes						
bbb						
	P01	P02	P03	P04	P06	
All	5	5	5	4	4	
C01	5	5	5	4	4	
C02	5	5	5	4	4	
C03	5	5	5	4	4	

NW1201 Physical Chemistry I					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
3	NW1201	Physical Chemistry I	4	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

The students gain knowledge about the general principles for the description of physico-chemical contexts. They understand the basics of chemical and electrochemical equilibria and can apply them to different reactions. They are capable of independently performing and evaluating physical-chemical experiments.

Teaching Methods and Techniques:

General chemistry: Description of molecular interactions, ideal and real gases, gas mixtures, states of aggregation, single and binary systems with the phases gaseous / liquid / solid, substance separation; Thermodynamics: Thermodynamic functions (ΔU , ΔH , ΔS and ΔG), main theorems of thermodynamics and their application, cycles, the chemical potential, law of mass action: chemical and phase equilibria; Electrochemistry: electrolyte equilibria, electrical conductivity of ions in solution, electrochemical equilibrium (Nernst equation), electrode reactions and galvanic cells.

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Asist. Prof. Dr. Çağla Sözl

Assistants:

Recommended or Required Reading

Resources
Bard A. J., Faulkner L. R. „Electrochemical Methods: Fundamentals and Applications”, John Wiley & Sons, Inc., 2001
Bechmann W., Schmidt J. „Einstieg in die Physikalische Chemie für Nebenfächler”, Vieweg-Teubner Verlag, 2010
Atkins P., de Paulo J., „Physical Chemistry”, W. H. Freeman and Company, 2006
Sarıkaya Y. „Fizikokimya”, Gazi Kitabevi, 2000

Das ist nur eine Liste der empfohlenen Literatur.

Course Category

Mathematics and Basic Sciences	: 20	Education	:
Engineering	:	Science	: 70
Engineering Design	:	Health	:
Social Sciences	:	Field	: 10

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Reaction kinetics: Basics and definitions Rules for reaction rates		Lecture notes Books selected for the lect
2	Combined reactions Approximation method Temperature dependence of reaction rate		Lecture notes Books selected for the lect
3	Thermodynamic: basic concepts Temperature and the 0th law of thermodynamics		Lecture notes Books selected for the lect
4	Real Gases Ideal Gases		Lecture notes Books selected for the lect
5	Laboratory: Thermochemistry- To determine principles of calorimetry		Lab manual
6	Work, heat, energy The 1st rule of thermodynamics Cyclic processes, Carnot cycle state functions		Lecture notes Books selected for the lect
7	Enthalpy, The Joule Thomson Effect, The 2nd law of thermodynamics, entropy Laboratory: Thermochemistry-Part II		Lecture notes Books selected for the lect
8	The third law of thermodynamics, The Helmholtz and Gibbs Energies, Maxwell relations		Lecture notes Books selected for the lect
9	Laboratory: To calculate the distribution coefficient of ammonia between water and chloroform		Lab manual
10	Laboratory: Experiment on solubility of solids to calculate the enthalpy value by using the Gibbs Helmholtz equation		Lab manual
11	Phase diagrams Phase stability and Phase transitions		Lecture notes Books selected for the lect
12	Phase stability and phase transitions continued The thermodynamic description of mixtures The properties of solutions		Lecture notes Books selected for the lect
13	Activities		Lecture notes Books selected for the lect
14	Spontaneous chemical reactions The response of equilibria to the conditions Equilibrium electrochemistry		Lecture notes Books selected for the lect

Course Learning Outcomes

No	Learning Outcomes
C01	To be able to solve the reaction rate and the reaction constant
C02	To be able to determine the effect of concentration, temperature, and time on the reaction rate
C03	To learn the behavior of real and ideal gases
C04	To learn the laws of thermodynamic
C05	To perform calculations with thermodynamic variables
C06	To determine the properties of a system by using the thermodynamic variables
C07	To understand the equilibrium of a system by using the thermodynamic variables
C08	To be able to interpret phase diagrams,; to be able to draw phase diagrams by using the required information
C09	To understand electrochemical cells and to be able to write the equations for the electrochemical reactions.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%10
Attendance	0	%0
Practice	0	%10
Project	0	%0
Final examination	1	%40
Total		%100

Contribution of Learning Outcomes to Programme Outcomes								
bbb								
	P01	P02	P03	P04	P05	P06	P07	
C01	4	5	5	1	1	5	5	
C02	4	5	5	1	1	5	5	
C03	2	5	5	1	1	5	5	
C04	2	5	5	1	1	5	5	
C05	5	5	5	1	1	5	5	
C06	5	4	5	1	1	5	5	
C07	3	4	5	1	1	5	5	
C08	3	5	5	1	1	5	5	
C09	5	5	5	1	1	5	5	



TUR001 Turkish I					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
3	TUR001	Turkish I	2	2	2

Mode of Delivery:

Face to Face

Language of Instruction:

Turkish

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

The goal is to educate individuals who speak their mother tongue effectively, have effective speech, writing, reading and listening skills and strong communication skills.

Teaching Methods and Techniques:

Language-Culture-Communication-Grammer

Prerequisites and co-requisites:

Course Coordinator:

Asist. Prof. Dr. Enis DİNÇ

Name of Lecturers:

Lecturer Gül Ayşe AKAR

Assistants:

Recommended or Required Reading

Resources CORBALLIS, Michael. C., İşaretten Konuşmaya Dilin Kökeni ve Gelişimi, (Çev: Aybek Görey), Kitap Publishing House, İstanbul, 2003., DEMİR, Nurettin, Türk Dili El Kitabı, G

Course Category

Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	:
Engineering Design	:	Health	:
Social Sciences	:	Field	:
	100		

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	The language and the language universals		
2	The language and the place of the Turkish language between the world languages		
3	The alphabets used in Turkish writing		
4	The relationship between the language and the culture		
5	Phonetics and phonetic events		
6	The theory of forms (the endings in Turkish, the word construction)		
7	Word structure		
8	word types		
9	Components of Sentence		
10	Types of sentence		
11	The vocabulary of Turkish		
12	The interaction between languages and the influence of Turkish on world languages		
13	Current problems of the Turkish language		
14	The influence of the mass media on the language		

Course Learning Outcomes

No	Learning Outcomes
C01	Students understand the language in all aspects and are familiar with language universals.
C02	Students can categorize the languages from the aspect of origin and structure.
C03	Students can list the characteristics of the languages and explain the types of languages.
C04	Students understand the differences between terms such as "dialect, accent etc."
C05	Students think of terms like "mother tongue, original language, artificial language, lingua franca, official language"
C06	Students determine the position of the Turkish language between the world languages.
C07	Students think about culture and analyze the relationships between cultures. They analyze the references of culture to language.
C08	Students understand the connection between culture and language.
C09	Students understand the grammar rules of the Turkish language.
C10	Students analyze the grammar rules.
C11	Students internalize the rules of grammar and use in daily life correspondence.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%40	Course Duration	14	2	28
Quizzes	0	%0	Hours for off-the-c.r.stud	0	0	0
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	0	%0	Mid-terms	1	2	2
Project	0	%0	Practice	14	2	28
Final examination	1	%60	Laboratory	0	0	0
Total		%100	Project	0	0	0
			Final examination	1	2	2
			Total Work Load			60
			ECTS Credit of the Course			2

Contribution of Learning Outcomes to Programme Outcomes							
bbb							

	P01	P02	P03	P04	P05	P06	P07
All	1	1	1	1	1	1	1
C01	1	1	1	1	1	1	1
C02	1	1	1	1	1	1	1
C03	1	1	1	1	1	1	1
C04	1	1	1	1	1	1	1
C05	1	1	1	1	1	1	1
C06	1	1	1	1	1	1	1
C07	1	1	1	5	1	1	1
C08	1	1	1	1	1	1	1
C09	1	1	1	1	1	1	1
C10	1	1	1	1	1	1	1
C11	1	1	1	1	1	1	1



AIT002 Principles of Atatürk and History of Turkish Revolution II					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
4	AIT002	Principles of Atatürk and History of Turkish Revolution II	2	2	2

Mode of Delivery:

Face to Face

Language of Instruction:

Turkish

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

To inform students about political, economic, social and cultural facts of the historical period beginning from 1923 to the present. To provide students with some significant examples of a multi-layered point of view in evaluating historical events. With an interdisciplinary perspective, to introduce to students some basic theoretical concepts, discussions and methods of thought of different social sciences, with particular emphasis on history.

Teaching Methods and Techniques:

Basic political, economic, social and cultural facts of the historical period beginning from 1923 to the present; fundamental academic interpretations on them.

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Dr. Esra Eren

Assistants:

Recommended or Required Reading	
Resources	Derleme Ders Notu / Syllabus Eric Hobsbawm, "Kuşbakışı 20. Yüzyıl", Kısa 20 Yüzyıl: Aşırı İktisat Çağı içinde , s. 13-31 Cemil Koçak, "Siyasal Tarih: 1923-1950", Çağdaş Türk Derleme Ders Notu / Syllabus Eric Hobsbawm, "Kuşbakışı 20. Yüzyıl", Kısa 20 Yüzyıl: Aşırı İktisat Çağı içinde , s. 13-31 Cemil Koçak, "Siyasal Tarih: 1923-1950", Çağdaş Türk

Course Category			
Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	:
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents			
Week	Topics	Study Materials	Materials
1	An overview of the 20th century		
2	Political Life between 1923-1945		
3	The formation of the Republican Ideology and the Kemalist Principles		
4	The Social and Cultural Transformation between 1923-1950		
5	The Turkish Economy between 1923-1945		
6	International Relations of Turkey between 1923-1945		
7	The Passage of Turkey to the plural political system: 1945-1950		
8	MIDTERM		
9	1950-1960: Political Developments During the Years of Democratic Party		
10	Politics in Turkey between 1960-1980		
11	Economic Development and Social change in Turkey between 1960-1980		
12	The Military Intervention in 1980 and the Rise of the Neo-Liberalism		
13	Gender Politics in Turkey		
14	The Constitutions in Turkey		

Course Learning Outcomes	
No	Learning Outcomes
C01	The students will acquire a perspective to evaluate the 20.th century.
C02	The students will evaluate the political, economic and cultural policies of the early republican era.
C03	The students will evaluate the political, economic and cultural policies of the Democratic Party era.
C04	The students will evaluate the political, economic and cultural policies after the military coup of 1980.
C05	The students will evaluate today within the context of Republican history.

Program Learning Outcomes	
No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		%100

	P01	P02	P03	P04	P05	P06	P07
All	5	5	5	5	5	5	5



ENG202 English IV					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
4	ENG202	English IV	3	3	2

Mode of Delivery:

Face to Face

Language of Instruction:

English

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

The Students should have english B2 level knowledge in reading, writing, speaking and grammar.

Teaching Methods and Techniques:

Provide students with the ability to write at the basic level (to introduce themselves and others physically / introduce themselves and others as characters / write short stories / CV / e-mail / composition) • Ensure that students improve their B1 level speaking skills (verbal presentation of self and others / directions / directions

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Okutman İlknur KARADAĞLI DİRİK

Assistants:

Recommended or Required Reading

Resources Hutchinson, T. & Sherman, K. (2012). Network 3. Oxford University Press: New York

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2

Course Category

Mathematics and Basic Sciences	:	Education	:	100
Engineering	:	Science	:	
Engineering Design	:	Health	:	
Social Sciences	:	Field	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to the course and the course materials		
2	Welcome to school! Introducing yourself/ Asking questions/ General introduction to English		
3	Let's introduce ourselves/ Welcoming others/Personal information/Present simple and present continuous		
4	Reading and writing: Ms Medina's Spanish Class/ The fashionable milliner		
5	Things happen/ Describing unexpected events/Expressions with 'get'/ Present perfect with 'for' and 'since'		
6	Reading and writing: The 90/10 Secret/ You can do it!		
7	Describing a location/ Describing housing/ Articles		
8	Reading and writing: Sofa Surfing/ The Alhambra		
9	Midterm exams		
10	Seeing old friends/ Talking about an old friend/ Phrasal verbs/ Separable and non-separable phrasal verbs/ reading and sp		
11	Finding a lost friend/Unit 5: Congratulations!/Discussing events in the past		
12	Achievements/Present perfect and past simple/ Reading and Speaking: Want to win? Get Lin!		
13	Adventure seekers/Unit 6: Healthy Living: Planning to do something healthy/ Health and fitness/ Future/Reading and writin		
14	A healthy lifestyle/ Unit 7: What a plan!/Talking about being late/Transportation problems/Past perfect/Reading and writing		
15	A New York City Taxi Driver/ Unit 8: Eat up! Making suggestions/Describing food/ Tag questions/Reading and Writing: 46 F		

Course Learning Outcomes

No	Learning Outcomes
C01	Students will have 'B1' level of English knowledge.
C02	Students will develop their reading comprehension skills at B1 level.
C03	Students will improve their ability to understand what they listen at B1.
C04	Students will be informed at B1 level and will be able to use it effectively.
C05	Students will learn vocabulary at B1 level and use them during reading, listening and speaking.
C06	Students will improve their writing abilities at the baseline level (to promote themselves and others physically / introduce themselves and others as characters / write short stories / CV / e-mail).
C07	Students will improve their speaking skills at B1 (verbally introducing themselves / others / asking directions / making directions / telling them what they have done in a past time / describing their

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		%100

MBT202 Biophysical Chemistry					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
4	MBT202	Biophysical Chemistry	4	4	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutsch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

Being able to use knowledge about physics, chemistry and biology in one discipline and to analyze biomolecules with modern methods.

Teaching Methods and Techniques:

Optical properties, surface structure and surface energy of biomolecules. Adsorption. Characterization techniques of biomolecules: MALDI-TOF, LDPI-MS, SIMS, Fluorescence microscopy.

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Assistants:

Assistants:
Asist Prof.Dr. Orkide Coskuner Weber

Recommended or Required Reading

Resources	Modern Biophysical Chemistry: Detection and Analysis of Biomolecules, Peter Jomo Walla, 2009 Lecture notes
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Course Category

Mathematics and Basic Sciences	:	Education	:
Engineering	: 10	Science	: 90
Engineering Design	:	Health	:
Social Sciences	:	Field	: 100

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Basic methods in biophysical chemistry		
2	Optical properties of biomolecules		
3	Basic fluorescence techniques		
4	Physical properties of surfaces of biomolecules		
5	Chemical properties of surfaces of biomolecules		
6	Protein-surface interactions I		
7	Protein-surface interactions II		
8	Surface modification of biomolecules I		
9	Surface modifications of biomolecules II		
10	Surface characterization of biomolecules in vacuum		
11	Surface characterization of biomolecules in aqueous medium		
12	Fluorescence microscopy		

Recommended Optional Programme Components

BIO111 Biology

Course Learning Outcomes

No	Learning Outcomes
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Learning Outcomes	
C01	Gaining the ability of implementing concepts from physics and chemistry to explain biological processes

C02 Being able to choose the appropriate method to analyze biomolecules.

Program Learning Outcomes

No	Learning Outcome
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No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.

P07 Having knowledge about work occupational work and safety.

P02 Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.

P05	Having computational skills for research
P01	Working with modern scientific usage

P01 Working with modern scientific sources.

P03 Having theoretical and practical skills in the area of biotechnology.

P04 Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	1	%40
Final examination	1	%40
Total		%100

Contribution of Learning Outcomes to Programme Outcomes						
bbb						
	P01	P02	P03	P04	P06	
All	5	5	4	5	5	
C01	5	5	4	5	5	
C02	5	5	4	5	5	



MBT204 Microbiology I					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
4	MBT204	Microbiology I	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

Having an understanding of diversity and physiology of microorganisms.

Teaching Methods and Techniques:

Structures of viruses, bacteria and fungi. Genetic transfer in these organisms. Bacterial photosynthesis. Pathogenic microorganisms.

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Associate Prof.Dr. Can Murat Ünal

Assistants:

Recommended or Required Reading

Resources	Allgemeine Mikrobiologie, Georg Fuchs, Georg-Thieme Verlag Lecture notes
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Course Category			
Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	: 100
Engineering Design	:	Health	:
Social Sciences	:	Field	: 100

Weekly Detailed Course Contents			
Week	Topics	Study Materials	Materials
1	Structure of bacterial cell, cell membrane		
2	Biology of fungi		
3	Bacterial virology		
4	Genetics of bacteria		
5	Living environments of bacteria and their adaptations to these		
6	Bacterial metabolism		
7	Photosynthesis in bacteria		
8	Transportsystems		
9	Pathogenic microorganisms		

Recommended Optional Programme Components

BIO111 Biology

Course Learning Outcomes

No	Learning Outcomes
C01	Having an understanding of diversity, physiology and proliferation of microorganisms.
C02	Having an understanding of microbial pathogens.
C03	Having an understanding of the interaction between different species.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	1	%40
Final examination	1	%40
Total		%100

	P01	P02	P03	P04	P06
All	5	4	5	5	5
C01	5	4	5	5	5
C02	5	4	5	5	5
C03	5	4	5	5	5



MBT212 Biochemistry II					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
4	MBT212	Biochemistry II	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutsch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

Understanding of molecular functions of proteins and lipids. Gaining knowledge about cell compartments and their functions.

Teaching Methods and Techniques:

Proteins, lipids, lipoproteins, antibodies, enzyme kinetics, metabolism

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Asist. Prof. Dr. Orkide Coşkun Weber

Assistants:

Recommended or Required Reading

Resources Voet, Donald / Voet, Judith G. / Pratt, Charlotte W. Lehrbuch der Biochemie, Herausgegeben von Beck-Sickinger, Annette / Hahn, Ulrich
Lecture notes

Course Category

Mathematics and Basic Sciences	:	Education	:	
Engineering	:	Science	:	100
Engineering Design	:	Health	:	
Social Sciences	:	Field	:	100

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Peptides and protein folding		
2	Two dimensional electrophoresis		
3	Chaperones: GroEL und GroES		
4	Protein characterization, antibody structure		
5	Structure and function of myoglobin and hemoglobin, sickle cell anemia		
6	Enzymkinetics, Michaelis-Menten equation		
7	Glycoproteins		
8	Glycolysis and Gluconeogenesis		
9	Krebs cycle		
10	Electron transport, ATP synthesis		
11	Defence mechanisms against toxic radicals		
12	Degradation of proteins		

Recommended Optional Programme Components

CHE111 Chemistry I
CHE112 Chemistry II
MBT211 Biochemistry I

Course Learning Outcomes

No	Learning Outcomes
C01	Understanding processes in bioenergetics.
C02	Understanding metabolism of proteins, lipids, carbohydrates and nucleic acids.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%20	Course Duration	14	3	42
Quizzes	0	%0	Hours for off-the-c.r.stud	14	4	56
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	0	%0	Mid-terms	1	10	10
Project	1	%40	Practice	0	0	0
Final examination	1	%40	Laboratory	10	4	40
Total		%100	Project	1	10	10
			Final examination	1	10	10
			Total Work Load			168
			ECTS Credit of the Course			6

Contribution of Learning Outcomes to Programme Outcomes						
bbb						
	P01	P02	P03	P04	P06	
All	5	5	3	3	3	
C01	5	5	3	3	3	
C02	5	5	3	3	3	



MBT222 Molecular Biotechnology I					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
4	MBT222	Molecular Biotechnology I	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

The students learn research areas of different fields in biotechnology along with the appropriate application methods. They get to know model organisms used in biotechnological processes.

Teaching Methods and Techniques:

Research areas of different fields in biotechnology and their applications. Model organisms. Fermentation technologies. Cleaning of biotechnological equipment. Production of antibiotics, biogas, bioplastic and enzymes.

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Asist. Prof. Dr. Necip Ozan Tiryakioğlu

Assistants:

Recommended or Required Reading

Resources	Biotechnologie für Einsteiger, Renneberg Lecture notes
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Course Category

Mathematics and Basic Sciences	:		Education	:	
Engineering	:	10	Science	:	90
Engineering Design	:		Health	:	
Social Sciences	:		Field	:	100

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Fields of biotechnology (red, green and white biotechnology)		
2	Model organisms I		
3	Model organisms II		
4	Selection of high-producer organisms.		
5	Basics of biotechnological production		
6	Fermentation technologies		
7	Cleaning of biotechnological equipment.		
8	Production of antibiotica		
9	Cleaning of waste water		
10	Production of biogas and bioplastic		
11	Enzyme production, bioleaching		

Recommended Optional Programme Components

BIO111 Biology

Course Learning Outcomes

No	Learning Outcomes
C01	Having knowledge about different fields of biotechnology.
C02	Having the ability to apply the knowledge in basic sciences to applications in biotechnology.
C03	Having an understanding of biotechnology equipment.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	1	%40
Final examination	1	%40
Total		%100

Contribution of Learning Outcomes to Programme Outcomes							
bbb							
	P01	P02	P03	P04	P06	P07	
All	5	5	5	5	4	4	
C01	5	5	5	5	4	4	
C02	5	5	5	5	4	4	
C03	5	5	5	5	4	4	



Turkish-German University

Faculty of Science
Molecular Biotechnology (German)

04-07

TUR002 Turkish II					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
4	TUR002	Turkish II	2	2	2

Mode of Delivery:

Face to Face

Language of Instruction:

Turkish

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

The aim of the course is to educate individuals about using their native language effectively and to have effective speaking, writing, reading and listening skills.

Teaching Methods and Techniques:

Composition Plan / Article Types / Writing Rules / Punctuation Marks

Prerequisites and co-requisites:

Course Coordinator:

Asist. Prof. Dr. Enis DİNÇ

Name of Lecturers:

Lecturer Gül Ayşe AKAR

Assistants:

Recommended or Required Reading

Resources ALPAY, N., Dilimiz Dillerimiz Uygulama Üzerine Yazılar, İstanbul, Metis Publishing, İstanbul, 2004., ALPAY, N., Türkçe Sorunları Kılavuzu, Metis Publishing, İstanbul, 2000., AKALIN, Şükrü Halûk, vd., Türk Dili II, Muhsin Macit (ed.), 4. Edition, Anadolu Üniversitesi Publishing, Eskişehir, 2015.

Ara Sınav+Final

Course Category

Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	:
Engineering Design	:	Health	:
Social Sciences	: 100	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	General Written Composition Information / Expression Forms		
2	Punctuation Marks		
3	Writing Rules		
4	Written Expression Disorders		
5	Opinion Writings (Articles, Critiques, Essays etc.)		
6	Opinion Writings (Interview, Diary, Biography, Autobiography)		
7	Literary Writings (Poetry, Story)		
8	Literary Writings (Novel, Theater)		
9	Scholar Articles		
10	Formal Correspondences (Petitions, Minutes, Decrees, Reports)		
11	Official Correspondence (Curriculum Vitae, Letter, Business Letter, Official Letter, Open Letter)		
12	Effective and Critical Reading		
13	Effective Listening and Listening Types		
14	Oratory		

Course Learning Outcomes

No	Learning Outcomes
C01	Students by comprehending the functions of narrative forms in writing, construct a composition.
C02	Students understand the uses of punctuation marks and use them correctly.
C03	Students understand the rules of writing in Turkish language and uses the rules in daily life.
C04	Students explain the features of opinion essays and gets ideas about how to develop the opinion in these articles.
C05	Students distinguish the types of opinion essays. They learn about these types of essays and examine this kind of texts in Turkish Literature.
C06	Students realize the characteristics of artistic writing. Students distinguish this type of writing from opinion essays and recognize the examples of artistic writing from Turkish Literature.
C07	Students distinguish the types of poetry. They examine examples of different poetry types.
C08	Students analyze the elements of the story. They distinguish the story types.
C09	Students examine how the genre of the novel develops in world literature and Turkish literature. They evaluate the differences of novel types.
C10	Students have information about the types of theater. They evaluate the differences of theater types in World Literature and Turkish Literature.
C11	Students learn how to do scientific research. They examine the examples on how to show resources in a scientific research. They understand that writing a scientific paper is a scientific code of etf
C12	Students analyze correspondence types. They understand the characteristics of these species.
C13	They examine effective reading methods. They determine which methods are used in terms of their own learning strategy. They apply reading methods in daily life and develop a strategy of self-r
C14	Students analyze the types of listening and makes a synthesis about which listening methods to use in communicating with people in daily life.
C15	Understands the basic principles of effective conversation. They think about how this kind of speech should be done and value the impact of body language on speech. They analyze speech typ
C16	Students explain the rules of speech that should be considered when talking in an effective presentation. They understand how to make the presentation more effective by paying attention to pront

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%40	Course Duration	14	2	28
Quizzes	0	%0	Hours for off-the-c.r.stud	0	0	0
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	0	%0	Mid-terms	1	1	1
Project	0	%0	Practice	0	0	0
Final examination	1	%60	Laboratory	0	0	0
Total		%100	Project	0	0	0
			Final examination	1	1	1
			Total Work Load			30
			ECTS Credit of the Course			1

Contribution of Learning Outcomes to Programme Outcomes							
bbb							
	P01	P02	P03	P04	P05	P06	P07
C01	1	1	1	1	1	1	1
C02	1	1	1	1	1	1	1
C03	1	1	1	1	1	1	1
C04	5	5	5	1	5	5	5
C05	5	5	5	1	5	5	5
C06	1	1	1	1	1	1	1
C07	1	1	1	1	1	1	1
C08	1	1	1	1	1	1	1
C09	1	1	1	1	1	1	1
C10	1	1	1	1	1	1	1
C11	5	5	5	1	5	5	5
C12	1	1	1	1	1	1	1
C13	5	5	5	1	5	5	5
C14	5	5	5	1	5	5	5
C15	5	5	5	1	5	1	1
C16	5	5	5	1	5	1	1



Turkish-German University

Faculty of Science
Molecular Biotechnology (German)

05-01

ENG341 Technical English I					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
5	ENG341	Technical English I	2	2	2

Mode of Delivery:

Face to Face

Language of Instruction:

English

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

The Students should have technical english B2 level knowledge in reading, writing, speaking and grammar.

Teaching Methods and Techniques:

Provide students with the ability to write at the basic level (to introduce themselves and others physically / introduce themselves and others as characters / write short stories / CV / e-mail / composition) • Ensure that students improve their B1 level speaking skills (verbal presentation of self and others / directions / directions

Prerequisites and co-requisites:

(ENG101 or ENG102)

Course Coordinator:

Name of Lecturers:

Okutman İlknur KARADAĞLI DİRİK

Assistants:

Recommended or Required Reading

Resources Hutchinson, T. & Sherman, K. (2012). Network 3. Oxford University Press: New York

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2

Course Category

Mathematics and Basic Sciences	:	Education	:	100
Engineering	:	Science	:	
Engineering Design	:	Health	:	
Social Sciences	:	Field	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to the course and the course materials		
2	Welcome to school! Introducing yourself/ Asking questions/ General introduction to English		
3	Let's introduce ourselves/ Welcoming others/Personal information/Present simple and present continuous		
4	Reading and writing: Ms Medina's Spanish Class/ The fashionable milliner		
5	Things happen/ Describing unexpected events/Expressions with 'get'/ Present perfect with 'for' and 'since'		
6	Reading and writing: The 90/10 Secret/ You can do it!		
7	Describing a location/ Describing housing/ Articles		
8	Reading and writing: Sofa Surfing/ The Alhambra		
9	Midterm exams		
10	Seeing old friends/ Talking about an old friend/ Phrasal verbs/ Separable and non-separable phrasal verbs/ reading and sp		
11	Finding a lost friend/Unit 5: Congratulations!/Discussing events in the past		
12	Achievements/Present perfect and past simple/ Reading and Speaking: Want to win? Get Lin!		
13	Adventure seekers/Unit 6: Healthy Living: Planning to do something healthy/ Health and fitness/ Future/Reading and writin		
14	A healthy lifestyle/ Unit 7: What a plan!/Talking about being late/Transportation problems/Past perfect/Reading and writing		
15	A New York City Taxi Driver/ Unit 8: Eat up! Making suggestions/Describing food/ Tag questions/Reading and Writing: 46 F		

Course Learning Outcomes

No	Learning Outcomes
C01	Students will have 'B1' level of English knowledge.
C02	Students will develop their reading comprehension skills at B1 level.
C03	Students will improve their ability to understand what they listen at B1.
C04	Students will be informed at B1 level and will be able to use it effectively.
C05	Students will learn vocabulary at B1 level and use them during reading, listening and speaking.
C06	Students will improve their writing abilities at the baseline level (to promote themselves and others physically / introduce themselves and others as characters / write short stories / CV / e-mail).
C07	Students will improve their speaking skills at B1 (verbally introducing themselves / others / asking directions / making directions / telling them what they have done in a past time / describing their

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		%100

	P01	P04	P07
All	3	5	5



ISG001 Occupational Safety and Health I					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
5	ISG001	Occupational Safety and Health I	2	2	2

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

Teaching of basic theoretical information occupational health and safety field, basic legal arrangements on OHS law in Turkey; especially duties, competencies and responsibilities of the naval architects. To inform causes and effects of occupational accidents and illnesses and basic courses about preventive practices and basic legal arrangements in the shipyard industry.

Teaching Methods and Techniques:

Theoretical framework of occupational health and safety (OHS), national and international standards of the OHS; causes and effects of occupational accidents and illnesses and basic courses about preventive practices, basic legal arrangements on OHS law in Turkey, case studies and civil jurisdictions of Court of Appeals, analysis of the occupational accidents in shipyard industry.

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Mühendis Joachim Kuntze

Assistants:

Recommended or Required Reading

Resources	Yılmaz, F., Occupational Health and Safety Textbook" Yelekcı, M., "Worker Health and Safety" Esin, A., "Occupational Health and Safety" Çelebi, U.B., "Occupational Health and Safety Textbook" Yılmaz, F., Occupational Health and Safety Textbook" Yelekcı, M., "Worker Health and Safety" Esin, A., "Occupational Health and Safety" Çelebi, U.B., "Occupational Health and Safety in Shipyard Textbook"
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Course Category

Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	:
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Theoretical framework, definitions and scope of occupational health and safety. Cost of occupational accidents and illnesses		
2	Economical dimensions of occupational accidents and illnesses, importance of OHS for he enterprises		
3	Analysis of the risky fields-sectors of Turkey in OHS		
4	Causes of occupational accidents and illnesses: physical, ergonomic, chemical, biological, individual and psycho-social risks		
5	Components of preventive OHS approach: Risk Assessment and Management, Ergonomic Precautions, Organizing the OHS		
6	Components of preventive OHS approach: OHSAS 18001 Management System, Training, Regular Sanitary Control ve Occu		
7	National and international standartds and conventions in OHS. The legal arrangements concerned with OHS in Turkey: OH		
8	Midterm Exam		
9	The definitions, scope and juridical results of employer, employee, employer agent, workplace, subcontractor, occupational		
10	The regulations and guidelines on OHS: Occupational Health and Safety Regulation.		
11	The Regulation on Heavy and Hazardous Work, The Regulation About OHS Training, The Regulation on Workplace Health i		
12	Responsibilities of employer and employer agent (engineer-OHS expert) about occupational accidents and illnesses; case st		
13	Analysis of the statistics on occupational accidents and illnesses, the most frequent accidents and illnesses and precautions		
14	Case studies and court decisions of Court of Appeals.		

Course Learning Outcomes

No	Learning Outcomes
C01	Students shall learn the basic concepts related to occupational safety and health of workers
C02	To learn the causes and measures to be taken to prevent accidents at work and occupational diseases
C03	Students shall adopt risk, prevention, and safety culture
C04	To learn the causes of work-related accidents and the measures to be taken in Ship Building Industry
C05	Students shall understand Engineer's responsibility the terms of occupational safety

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		%100

	P01	P02	P03	P04	P05	P06	P07
All	5	5	5	5	5	5	5

MBT323 Molecular Biotechnology II					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
5	MBT323	Molecular Biotechnology II	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutsch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

Gaining knowledge about cloning techniques and their legal restrictions.

Teaching Methods and Techniques:

Cloning techniques, restriction enzymes, protein engineering, genetic fingerprint, law of gene technique

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Associate Prof.Dr. Can Murat Ünal

Assistants:

Recommended or Required Reading	
Resources	D. Clark, N. Pazdernik, Molekulare Biotechnologie: Grundlagen und Anwendungen Lecture notes

Course Category	Course Title	Course Description	Course Number	Course Credits	Course Status
General Education	English 101	First semester of English 101	101	3	Required
General Education	English 102	Second semester of English 101	102	3	Required
General Education	Math 101	First semester of Math 101	101	3	Required
General Education	Math 102	Second semester of Math 101	102	3	Required
General Education	Science 101	First semester of Science 101	101	3	Required
General Education	Science 102	Second semester of Science 101	102	3	Required
General Education	History 101	First semester of History 101	101	3	Required
General Education	History 102	Second semester of History 101	102	3	Required
General Education	Art 101	First semester of Art 101	101	3	Required
General Education	Art 102	Second semester of Art 101	102	3	Required
General Education	Physical Education 101	First semester of Physical Education 101	101	3	Required
General Education	Physical Education 102	Second semester of Physical Education 101	102	3	Required
General Education	Health 101	First semester of Health 101	101	3	Required
General Education	Health 102	Second semester of Health 101	102	3	Required
General Education	Language 101	First semester of Language 101	101	3	Required
General Education	Language 102	Second semester of Language 101	102	3	Required
General Education	Writing 101	First semester of Writing 101	101	3	Required
General Education	Writing 102	Second semester of Writing 101	102	3	Required
General Education	Computer 101	First semester of Computer 101	101	3	Required
General Education	Computer 102	Second semester of Computer 101	102	3	Required
General Education	Music 101	First semester of Music 101	101	3	Required
General Education	Music 102	Second semester of Music 101	102	3	Required
General Education	Physical Education 201	First semester of Physical Education 201	201	3	Required
General Education	Physical Education 202	Second semester of Physical Education 201	202	3	Required
General Education	Health 201	First semester of Health 201	201	3	Required
General Education	Health 202	Second semester of Health 201	202	3	Required
General Education	Language 201	First semester of Language 201	201	3	Required
General Education	Language 202	Second semester of Language 201	202	3	Required
General Education	Writing 201	First semester of Writing 201	201	3	Required
General Education	Writing 202	Second semester of Writing 201	202	3	Required
General Education	Computer 201	First semester of Computer 201	201	3	Required
General Education	Computer 202	Second semester of Computer 201	202	3	Required
General Education	Music 201	First semester of Music 201	201	3	Required
General Education	Music 202	Second semester of Music 201	202	3	Required
General Education	Physical Education 301	First semester of Physical Education 301	301	3	Required
General Education	Physical Education 302	Second semester of Physical Education 301	302	3	Required
General Education	Health 301	First semester of Health 301	301	3	Required
General Education	Health 302	Second semester of Health 301	302	3	Required
General Education	Language 301	First semester of Language 301	301	3	Required
General Education	Language 302	Second semester of Language 301	302	3	Required
General Education	Writing 301	First semester of Writing 301	301	3	Required
General Education	Writing 302	Second semester of Writing 301	302	3	Required
General Education	Computer 301	First semester of Computer 301	301	3	Required
General Education	Computer 302	Second semester of Computer 301	302	3	Required
General Education	Music 301	First semester of Music 301	301	3	Required
General Education	Music 302	Second semester of Music 301	302	3	Required
General Education	Physical Education 401	First semester of Physical Education 401	401	3	Required
General Education	Physical Education 402	Second semester of Physical Education 401	402	3	Required
General Education	Health 401	First semester of Health 401	401	3	Required
General Education	Health 402	Second semester of Health 401	402	3	Required
General Education	Language 401	First semester of Language 401	401	3	Required
General Education	Language 402	Second semester of Language 401	402	3	Required
General Education	Writing 401	First semester of Writing 401	401	3	Required
General Education	Writing 402	Second semester of Writing 401	402	3	Required
General Education	Computer 401	First semester of Computer 401	401	3	Required
General Education	Computer 402	Second semester of Computer 401	402	3	Required
General Education	Music 401	First semester of Music 401	401	3	Required
General Education	Music 402	Second semester of Music 401	402	3	Required
General Education	Physical Education 501	First semester of Physical Education 501	501	3	Required
General Education	Physical Education 502	Second semester of Physical Education 501	502	3	Required
General Education	Health 501	First semester of Health 501	501	3	Required
General Education	Health 502	Second semester of Health 501	502	3	Required
General Education	Language 501	First semester of Language 501	501	3	Required
General Education	Language 502	Second semester of Language 501			

Mathematics and Basic Sciences	:		Education	:	
Engineering	:	20	Science	:	80
Engineering Design	:		Health	:	
Social Sciences	:		Field	:	100

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Model organisms and vectors		
2	Cloning strategies, targeted mutagenesis		
3	Cloning techniques, restriction enzymes, homologous recombination, CRISPR/Cas		
4	Application examples in the fields of green and white biotechnology		
5	Protein engineering		
6	Genetic fingerprint		
7	Application example chosen from scientific literature I		
8	Application example chosen from scientific literature II		

Recommended Optional Programme Components

MBT222 Molecular Biotechnology I

Course Learning Outcomes

No	Learning Outcomes
C01	Having an understanding of cell cloning techniques
C02	Learning legal aspects of cell cloning

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	1	%40
Final examination	1	%40
Total		%100

Contribution of Learning Outcomes to Programme Outcomes							
bbb							
	P01	P02	P03	P04	P06	P07	
All	5	5	5	5	5	5	
C01	5	5	5	5	5	5	
C02					5	5	



Turkish-German University

Faculty of Science
Molecular Biotechnology (German)

05-04-01

MBT361 Microbiology II					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
5	MBT361	Microbiology II	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Gaining knowledge about application methods of microbiology

Teaching Methods and Techniques:

Bacterial gene regulation, fermentation, antibiotika, enzymes, biosensors

Prerequisites and co-requisites:**Course Coordinator:****Name of Lecturers:**

Associate Prof.Dr. Can Murat Ünal

Assistants:**Recommended or Required Reading**

Resources Allgemeine Mikrobiologie, Georg Fuchs, Georg-Thieme Verlag
Lecture notes

Course Category

Mathematics and Basic Sciences	:	Education	:	
Engineering	:	Science	:	100
Engineering Design	:	Health	:	
Social Sciences	:	Field	:	100

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Gene regulation in bacteria, transcription factors		
2	Fermentation, production of organic acids		
3	Antibiotika		
4	Enzymes		
5	Pharmaproteins		
6	Energy production		
7	Biosensors		
8	Gram staining		
9	Production of ethanol with the help of fungi		

Recommended Optional Programme Components

MBT204 Microbiology I

Course Learning Outcomes**No Learning Outcomes**

C01 Having knowledge about application methods of microbiology
C02 Having an understanding of working with microorganisms in laboratory

Program Learning Outcomes**No Learning Outcome**

P06 Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07 Having knowledge about work occupational work and safety.
P02 Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05 Having computational skills for research data analysis purposes.
P01 Working with modern scientific sources.
P03 Having theoretical and practical skills in the area of biotechnology.
P04 Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%20	Course Duration	13	3	39
Quizzes	0	%0	Hours for off-the-c.r.stud	13	5	65
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	0	%0	Mid-terms	1	10	10
Project	1	%40	Practice	0	0	0
Final examination	1	%40	Laboratory	10	3	30
Total		%100	Project	1	12	12
			Final examination	1	10	10
			Total Work Load			166
			ECTS Credit of the Course			6

Contribution of Learning Outcomes to Programme Outcomes						
bbb						
	P02	P03	P04	P06	P07	
All	5	5	5	5	5	
C01	5	5	5	5	5	
C02	5	5	5		5	



MBT363 Immunology					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
5	MBT363	Immunology	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Gaining knowledge about mammalian immune system

Teaching Methods and Techniques:

Immune system, lymphocytes, antibodies, immune signaling

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Associate Prof.Dr. Can Murat Ünal

Assistants:

Recommended or Required Reading

Resources	Immunologie, Janeway, Spektrum Verlag Lecture notes
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Course Category

Mathematics and Basic Sciences	:	Education	:	
Engineering	:	Science	:	100
Engineering Design	:	Health	:	
Social Sciences	:	Field	:	100

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Immune system		
2	Native, humoral and adaptive immune response		
3	Lymphocytes		
4	Antigen recognition		
5	Antigen receptors in lymphocytes		
6	T-cells		
7	Immune signaling		
8	Vaccines		
9	Recombinant antibody technology		

Recommended Optional Programme Components

BIO111 Biology

Course Learning Outcomes

No	Learning Outcomes
C01	Having an understanding of mammalian immune system
C02	Having knowledge about diseases of the immune system and vaccines

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	1	%40
Final examination	1	%40
Total		%100

Contribution of Learning Outcomes to Programme Outcomes						
bbb						
	P01	P02	P03	P04	P06	
All	5	5	5	5	5	
C01	5	5	5	5	5	
C02	5	5	5	5	5	



Turkish-German University

Faculty of Science
Molecular Biotechnology (German)

05-04-03

MBT365 Ecology					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
5	MBT365	Ecology	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Gaining an understanding of fundamental principles of ecology and the relationship between living systems and the environment.

Teaching Methods and Techniques:

Autecology, sinecology, demecology, ecosystems

Prerequisites and co-requisites:**Course Coordinator:****Name of Lecturers:**

Undefined Belirsiz

Assistants:**Recommended or Required Reading**

Resources Nentwig et al. (2004): Ökologie. Gustav-Fischer-Verlag

Course Category

Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	: 100
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Autecology, biotic and abiotic effects on organisms.		
2	Environmental factors, temperature, humidity, salt concentration, soil chemistry		
3	Hidrosfer, litosfer, atmosfer, biyosfer, antroposfer		
4	Demecology, demography, r/K selection, oscillations, metapopulations		
5	Sinecology		
6	Evolution		
7	Climate change and global warming		
8	Systems ecology (cybernetics)		

Course Learning Outcomes**No Learning Outcomes**

C01 Canlı sistemler ile çevre arasındaki etkileşimi anlama becerisi

Program Learning Outcomes**No Learning Outcome**

P06 Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07 Having knowledge about work occupational work and safety.
P02 Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05 Having computational skills for research data analysis purposes.
P01 Working with modern scientific sources.
P03 Having theoretical and practical skills in the area of biotechnology.
P04 Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	1	%20
Project	0	%0
Final examination	1	%40
Total		%100

Contribution of Learning Outcomes to Programme Outcomes						
bbb						
	P01	P02	P03	P04	P05	P06
C01	3	5	5	5	2	5



Turkish-German University

Faculty of Science
Molecular Biotechnology (German)

05-04-04

MBT367 Evolution					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
5	MBT367	Evolution	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Having an understanding of Mendel and molecular genetics in animal populations.

Teaching Methods and Techniques:

Populations, species formation, evolution and genetic variation

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Associate Prof.Dr. Can Murat Ünal

Assistants:

Recommended or Required Reading

Resources	Evolutionbiologie, Volker Storch, Ulrich Welsch Lecture notes
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Course Category

Mathematics and Basic Sciences	:	Education	:	
Engineering	:	Science	:	100
Engineering Design	:	Health	:	
Social Sciences	:	Field	:	100

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Populations and gene pools		
2	Hardy-Weinberg Equilibrium		
3	Populations not in Hardy-Weinberg equilibrium		
4	Mutation, Natural selection		
5	Genetic drift		
6	Wallace, Darwin and On the Origin of Species		
7	Models for species formation		
8	Isolation mechanism		
9	Measurement of genetic variation		
10	Protein polymorphism		
11	Evolution and genetic variation		
12	Molecular techniques in evolution research		

Recommended Optional Programme Components

BIO111 Biology

Course Learning Outcomes

No	Learning Outcomes
C01	Having an understanding of species formation and isolation
C02	Having an understanding of the relationship between genetics and evolution
C03	Gaining knowledge about Mendel and molecular geneteics

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%20	Course Duration	13	5	65
Quizzes	0	%0	Hours for off-the-c.r.stud	13	6	78
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	0	%0	Mid-terms	1	10	10
Project	1	%40	Practice	0	0	0
Final examination	1	%40	Laboratory	0	0	0
Total		%100	Project	1	12	12
			Final examination	1	10	10
			Total Work Load			175
			ECTS Credit of the Course			6

Contribution of Learning Outcomes to Programme Outcomes						
bbb						
	P01	P02	P03	P04	P06	
All	5	5	5	5	5	
C01	5	5	5	5	5	
C02	5	5	5	5	5	
C03	5	5	5	5	5	



NW1301 Organic Chemistry for Biosciences					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
5	NW1301	Organic Chemistry for Biosciences	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Definition of the historical connection between organic chemistry, physical chemistry and biology

Teaching Methods and Techniques:

Amino acids, peptides, enzyme chemistry; Nucleic acids, Gene detection technology and recent research trends in drug discovery

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Asist Prof.Dr. Duygu Ekinici

Assistants:

Recommended or Required Reading

Resources Bioprozesstechnik, Chmiel, Spektrum
Organische und bioorganische Chemie, Bräse, S, Bülle, J, Hüttermann A, (2008) Wiley-VCH

Course Category

Mathematics and Basic Sciences	: 20	Education	:
Engineering	: 20	Science	:
Engineering Design	: 20	Health	:
Social Sciences	:	Field	: 40

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Biomimetic Chemistry-The Enzyme Models		
2	Historical Connection and Weak Interactions in chemistry and biology		
3	Molecular Recognition in Organic Chemistry		

Course Learning Outcomes

No	Learning Outcomes
C01	to enable students to develop the knowledge and skills bioreactors.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		%100

Contribution of Learning Outcomes to Programme Outcomes					
bbb					
	P01	P02	P05	P06	
All	3	3	1	3	



Turkish-German University

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Molecular Biotechnology (German)

05-05-01

NW1321 History of Science					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
5	NW1321	History of Science	2	2	2

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Having an understanding of the structure and research fields of history of science. To understand the historical events that led to the birth of modern science.

Teaching Methods and Techniques:

Science in the ancient Greece, Egypt and Mesopotamia. Science in the middle ages. Birth of modern science. Science in modern times.

Prerequisites and co-requisites:**Course Coordinator:****Name of Lecturers:**

Asist Prof.Dr. Neşe Aral

Assistants:**Recommended or Required Reading**

Resources Butterfield, H., The Origins of Modern Science
Lecture notes

Course Category

Mathematics and Basic Sciences	: 20	Education	:	
Engineering	: 20	Science	:	60
Engineering Design	:	Health	:	
Social Sciences	:	Field	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Meaning of science		
2	Science in Egypt and Mesopotamia		
3	Science in ancient Greece		
4	Science in middle ages and Islam		
5	Renaissance and its impacts		
6	Scientific revolutions		
7	Galilei, Newton, Kepler		
8	Physics, mathematics and medicine in the new age		
9	Quantum physics, Relativity		
10	Modern science		

Recommended Optional Programme Components

NW1323 Philosophy of Science

Course Learning Outcomes**No Learning Outcomes**

C01 Being able to define basic research fields in history of science
C02 Having an understanding of scientific studies in ancient and middle ages.
C03 Having an understanding of historical events that led to the birth of modern science.

Program Learning Outcomes**No Learning Outcome**

P06 Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07 Having knowledge about work occupational work and safety.
P02 Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05 Having computational skills for research data analysis purposes.
P01 Working with modern scientific sources.
P03 Having theoretical and practical skills in the area of biotechnology.
P04 Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%20	Course Duration	13	2	26
Quizzes	0	%0	Hours for off-the-c.r.stud	13	1	13
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	0	%0	Mid-terms	1	5	5
Project	1	%40	Practice	0	0	0
Final examination	1	%40	Laboratory	0	0	0
Total		%100	Project	1	10	10
			Final examination	1	10	10
			Total Work Load			64
			ECTS Credit of the Course			2

Contribution of Learning Outcomes to Programme Outcomes				
bbb				
	P01	P02	P06	
All	5	3	3	
C01	5	3	3	
C02	5	3	3	
C03	5	3	3	



Turkish-German University

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05-05-02

Philosophy of Science					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
5	NWI323	Philosophy of Science	2	2	2

Mode of Delivery:

Face to Face

Language of Instruction:

Deutsch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Having a knowledge about the definitions of science and philosophy of science. Having an understanding of the importance and methods of science. To be able to compare different philosophical views on science.

Teaching Methods and Techniques:

Definitions of science and philosophy of science, logical and scientific methods, different philosophical views on scientific method, thinkers of philosophy of science.

Prerequisites and co-requisites:**Course Coordinator:****Name of Lecturers:**

Asist. Prof. Dr. Neşe Aral

Assistants:**Recommended or Required Reading**

Resources A Historical Introduction to the Philosophy of Science, John Losee

Course Category

Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	: 100
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Definitions of science and philosophy of science		
2	Importance of science and philosophy		
3	Fundamental questions in philosophy of science		
4	Scientific method, logical thinking, induction, deduction		
5	Steps of scientific method and scientific criteria		
6	Classical and modern interpretations of scientific method		
7	Observation, experiment and measurement in scientific method		
8	Logical positivism, scientific realism and anti-realism, structuralism		
9	Scientific epistemology		
10	Popper, Kuhn, Feuerabend and their work		
11	Philosophy of mathematics and physics		
12	Philosophy of biology		
13	Science wars, Sokal Hoax		

Course Learning Outcomes**No Learning Outcomes**

C01 Bilimin tanımına ve bilim felsefesinin temel kavramlarına ve görüşlerine hakim olmak.

Program Learning Outcomes**No Learning Outcome**

P06 Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07 Having knowledge about work occupational work and safety.
P02 Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05 Having computational skills for research data analysis purposes.
P01 Working with modern scientific sources.
P03 Having theoretical and practical skills in the area of biotechnology.
P04 Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%40	Course Duration	14	2	28
Quizzes	0	%0	Hours for off-the-c.r.stud	14	1	14
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	0	%0	Mid-terms	1	0	0
Project	0	%0	Practice	0	0	0
Final examination	1	%60	Laboratory	0	0	0
Total		%100	Project	0	0	0
			Final examination	1	10	10
			Total Work Load			52
			ECTS Credit of the Course			2

Contribution of Learning Outcomes to Programme Outcomes				
bbb				
	P01	P02	P05	
C01	5	5	5	



Turkish-German University

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Molecular Biotechnology (German)

05-05-03

Scientific Ethics					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
5	NWI325	Scientific Ethics	2	2	2

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Having knowledge about the relationship between science, scientific research and ethics.

Teaching Methods and Techniques:

Relationship between science and ethics. Ethical laws regarding scientific research and publication processes.

Prerequisites and co-requisites:**Course Coordinator:****Name of Lecturers:**

Undefined Belirsiz

Assistants:**Recommended or Required Reading**

Resources EinFach Philosophieren, Wissenschaftsethik; Jennifer Blank, Olga Schierhorn

Course Category

Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	: 100
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Relationship between science and ethics.		
2	Plagiarism		
3	Scientific responsibility.		
4	Problems in ethics (gene technology)		
5	Bioethics.		

Course Learning Outcomes**No Learning Outcomes**

C01 Having knowledge about scientific ethics.

Program Learning Outcomes**No Learning Outcome**

P06 Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07 Having knowledge about work occupational work and safety.
P02 Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05 Having computational skills for research data analysis purposes.
P01 Working with modern scientific sources.
P03 Having theoretical and practical skills in the area of biotechnology.
P04 Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%40	Course Duration	14	2	28
Quizzes	0	%0	Hours for off-the-c.r.stud	14	1	14
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	0	%0	Mid-terms	1	5	5
Project	0	%0	Practice	0	0	0
Final examination	1	%60	Laboratory	0	0	0
Total		%100	Project	0	0	0
			Final examination	1	10	10
			Total Work Load			57
			ECTS Credit of the Course			2

Contribution of Learning Outcomes to Programme Outcomes				
bbb				
	P01	P04	P06	
C01	3	5	5	



Turkish-German University

Faculty of Science
Molecular Biotechnology (German)

05-05-04

Scientific Work					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
5	NWI401	Scientific Work	2	2	2

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

To provide the student with the ability to analyze the problem/system with which he/she is dealing and to develop solution ideas considering theoretical knowledge. To provide a useful experience through a self study to take the first step to his/her new career which will start after graduation. The student will communicate his/her study efficiently, verbal and written, so he/she will learn to express himself/herself better.

Teaching Methods and Techniques:

I. To provide the student with the ability to analyze the problem/system with which he/she is dealing and to develop solution ideas considering theoretical knowledge. II. To provide a useful experience through a self study to take the first step to his/her new career which will start after graduation. III. The student will communicate his/her study efficiently, verbal and written, so he/she will learn to express himself/herself better.

Prerequisites and co-requisites:**Course Coordinator:****Name of Lecturers:**

Dr. Rafet İşler

Assistants:**Recommended or Required Reading****Resources**

Will be disseminated to the students in digital form

Course Category

Mathematics and Basic Sciences	:		Education	:	
Engineering	:	40	Science	:	
Engineering Design	:	40	Health	:	
Social Sciences	:		Field	:	20

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Project work, literature search, presentations of exemplary studies from the methods of Materials science;		

Course Learning Outcomes

No	Learning Outcomes
C01	Formulate and analyze a problem by examining the current status
C02	Develop applicable suggestions and/or solution methods for the problem dealt with, considering theoretical knowledge.
C03	Gain the ability to implement a solution method to an existing problem and will be able to evaluate the results.
C04	Learn to express himself/herself by reporting and presenting the work.
C05	Learn to defend the idea that underlines the results of the study.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		%100

	P01	P02	P03	P04	P05	P06	P07
All	5	5	5	5	5	5	5



Turkish-German University

Faculty of Science
Molecular Biotechnology (German)

05-05-05

TUR009 Elective Academic Turkish					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
5	TUR009	Elective Academic Turkish	2	2	2

Mode of Delivery:

Face to Face

Language of Instruction:

Turkish

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

The goal is to educate individuals who speak their mother tongue effectively, have effective speech, writing, reading and listening skills and strong communication skills.

Teaching Methods and Techniques:

Language-Culture-Communication-Grammer

Prerequisites and co-requisites:**Course Coordinator:**

Asist. Prof. Dr. Enis DİNÇ

Name of Lecturers:

Lecturer Gül Ayşe AKAR

Assistants:**Recommended or Required Reading**

Resources ERCİLASUN, Ahmet Bilge, Türk Dili Tarihi Başlangıçtan 20.Yüzyıla, Akçağ Publishing, Ankara, 2011, ELİÖT, T. S., Kültür Üzerine Düşünceler. (Çev. S. Kantarcı) Kültür ve Tu

Course Category

Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	:
Engineering Design	:	Health	:
Social Sciences	: 100	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	The language and the language universals		
2	The language and the place of the Turkish language between the world languages		
3	The alphabets used in Turkish writing		
4	The relationship between the language and the culture		
5	Phonetics and phonetic events		
6	The theory of forms (the endings in Turkish, the word construction)		
7	Word structure		
8	word types		
9	Components of Sentence		
10	Types of sentence		
11	The vocabulary of Turkish		
12	The interaction between languages and the influence of Turkish on world languages		
13	Current problems of the Turkish language		
14	The influence of the mass media on the language		

Course Learning Outcomes

No	Learning Outcomes
C01	Students understand the language in all aspects and are familiar with language universals.
C02	Students can categorize the languages from the aspect of origin and structure.
C03	Students can list the characteristics of the languages and explain the types of languages.
C04	Students understand the differences between terms such as "dialect, accent etc."
C05	Students think of terms like "mother tongue, original language, artificial language, lingua franca, official language"
C06	Students determine the position of the Turkish language between the world languages.
C07	Students think about culture and analyze the relationships between cultures. They analyze the references of culture to language.
C08	Students understand the connection between culture and language.
C09	Students understand the grammar rules of the Turkish language.
C10	Students analyze the grammar rules.
C11	Students internalize the rules of grammar and use in daily life correspondence.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%40	Course Duration	14	2	28
Quizzes	0	%0	Hours for off-the-c.r.stud	0	0	0
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	0	%0	Mid-terms	1	2	2
Project	0	%0	Practice	14	2	28
Final examination	1	%60	Laboratory	0	0	0
Total		%100	Project	0	0	0
			Final examination	1	2	2
			Total Work Load			60
			ECTS Credit of the Course			2

Contribution of Learning Outcomes to Programme Outcomes							
bbb							

	P01	P02	P03	P04	P05	P06	P07
All	1	1	1	1	1	1	1
C01	1	1	1	1	1	1	1
C02	1	1	1	1	1	1	1
C03	1	1	1	1	1	1	1
C04	1	1	1	1	1	1	1
C05	1	1	1	1	1	1	1
C06	1	1	1	1	1	1	1
C07	1	1	1	1	1	1	1
C08	1	1	1	1	1	1	1
C09	1	1	1	1	1	1	1
C10	1	1	1	1	1	1	1
C11	1	1	1	1	1	1	1



ENG342 Technical English II					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
6	ENG342	Technical English II	2	2	2

Mode of Delivery:

Face to Face

Language of Instruction:

English

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

The Students should have technical english B2 level knowledge in reading, writing, speaking and grammar.

Teaching Methods and Techniques:

Provide students with the ability to write at the basic level (to introduce themselves and others physically / introduce themselves and others as characters / write short stories / CV / e-mail / composition) • Ensure that students improve their B1 level speaking skills (verbal presentation of self and others / directions / directions

Prerequisites and co-requisites:

(ENG101 or ENG102)

Course Coordinator:

Name of Lecturers:

Okutman İlknur KARADAĞLI DİRİK

Assistants:

Recommended or Required Reading

Resources Hutchinson, T. & Sherman, K. (2012). Network 3. Oxford University Press: New York

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Course Category

Mathematics and Basic Sciences	:	Education	:	100
Engineering	:	Science	:	
Engineering Design	:	Health	:	
Social Sciences	:	Field	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to the course and the course materials		
2	Welcome to school! Introducing yourself/ Asking questions/ General introduction to English		
3	Let's introduce ourselves/ Welcoming others/Personal information/Present simple and present continuous		
4	Reading and writing: Ms Medina's Spanish Class/ The fashionable milliner		
5	Things happen/ Describing unexpected events/Expressions with 'get'/ Present perfect with 'for' and 'since'		
6	Reading and writing: The 90/10 Secret/ You can do it!		
7	Describing a location/ Describing housing/ Articles		
8	Reading and writing: Sofa Surfing/ The Alhambra		
9	Midterm exams		
10	Seeing old friends/ Talking about an old friend/ Phrasal verbs/ Separable and non-separable phrasal verbs/ reading and sp		
11	Finding a lost friend/Unit 5: Congratulations!/Discussing events in the past		
12	Achievements/Present perfect and past simple/ Reading and Speaking: Want to win? Get Lin!		
13	Adventure seekers/Unit 6: Healthy Living: Planning to do something healthy/ Health and fitness/ Future/Reading and writin		
14	A healthy lifestyle/ Unit 7: What a plan!/Talking about being late/Transportation problems/Past perfect/Reading and writing		
15	A New York City Taxi Driver/ Unit 8: Eat up! Making suggestions/Describing food/ Tag questions/Reading and Writing: 46 F		

Course Learning Outcomes

No	Learning Outcomes
C01	Students will have 'B1' level of English knowledge.
C02	Students will develop their reading comprehension skills at B1 level.
C03	Students will improve their ability to understand what they listen at B1.
C04	Students will be informed at B1 level and will be able to use it effectively.
C05	Students will learn vocabulary at B1 level and use them during reading, listening and speaking.
C06	Students will improve their writing abilities at the baseline level (to promote themselves and others physically / introduce themselves and others as characters / write short stories / CV / e-mail).
C07	Students will improve their speaking skills at B1 (verbally introducing themselves / others / asking directions / making directions / telling them what they have done in a past time / describing their

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		%100



ISG002 Occupational Safety and Health II					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
6	ISG002	Occupational Safety and Health II	2	2	2

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

Teaching of basic theoretical information occupational health and safety field, basic legal arrangements on OHS law in Turkey; especially duties, competencies and responsibilities of the naval architects. To inform causes and effects of occupational accidents and illnesses and basic courses about preventive practices and basic legal arrangements in the shipyard industry.

Teaching Methods and Techniques:

Theoretical framework of occupational health and safety (OHS), national and international standards of the OHS; causes and effects of occupational accidents and illnesses and basic courses about preventive practices, basic legal arrangements on OHS law in Turkey, case studies and civil jurisdictions of Court of Appeals, analysis of the occupational accidents in shipyard industry.

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Mühendis Joachim Kuntze

Assistants:

Recommended or Required Reading	
Resources	Yılmaz, F., Occupational Health and Safety Textbook" Yelekcı, M., "Worker Health and Safety" Esin, A., "Occupational Health and Safety" Çelebi, U.B., "Occupational Health and Safety Textbook" Yılmaz, F., Occupational Health and Safety Textbook" Yelekcı, M., "Worker Health and Safety" Esin, A., "Occupational Health and Safety" Çelebi, U.B., "Occupational Health and Safety in Shipyard Textbook"

Course Category			
Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	:
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents			
Week	Topics	Study Materials	Materials
1	Theoretical framework, definitions and scope of occupational health and safety. Cost of occupational accidents and illnesses		
2	Economical dimensions of occupational accidents and illnesses, importance of OHS for he enterprises		
3	Analysis of the risky fields-sectors of Turkey in OHS		
4	Causes of occupational accidents and illnesses: physical, ergonomic, chemical, biological, individual and psycho-social risks		
5	Components of preventive OHS approach: Risk Assessment and Management, Ergonomic Precautions, Organizing the OHS		
6	Components of preventive OHS approach: OHSAS 18001 Management System, Training, Regular Sanitary Control ve Occu		
7	National and international standartds and conventions in OHS. The legal arrangements concerned with OHS in Turkey: OH		
8	Midterm Exam		
9	The definitions, scope and juridical results of employer, employee, employer agent, workplace, subcontractor, occupational		
10	The regulations and guidelines on OHS: Occupational Health and Safety Regulation.		
11	The Regulation on Heavy and Hazardous Work, The Regulation About OHS Training, The Regulation on Workplace Health i		
12	Responsibilities of employer and employer agent (engineer-OHS expert) about occupational accidents and illnesses; case st		
13	Analysis of the statistics on occupational accidents and illnesses, the most frequent accidents and illnesses and precautions		
14	Case studies and court decisions of Court of Appeals.		

Course Learning Outcomes	
No	Learning Outcomes
C01	Students shall learn the basic concepts related to occupational safety and health of workers
C02	To learn the causes and measures to be taken to prevent accidents at work and occupational diseases
C03	Students shall adopt risk, prevention, and safety culture
C04	To learn the causes of work-related accidents and the measures to be taken in Ship Building Industry
C05	Students shall understand Engineer's responsibility the terms of occupational safety

Program Learning Outcomes	
No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		%100

	P01	P02	P03	P04	P05	P06	P07
All	5	5	5	5	5	5	5



MBT324 Molecular Biotechnology III					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
6	MBT324	Molecular Biotechnology III	2	4	5

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

Having substantial experience in biotechnology applications.

Teaching Methods and Techniques:

Gene therapy, protein engineering, antibody technologies

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Associate Prof.Dr. Can Murat Ünal

Assistants:

Recommended or Required Reading

Resources	D. Clark, N. Pazdernik, Molekulare Biotechnologie: Grundlagen und Anwendungen Lecture notes
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Course Category			
Mathematics and Basic Sciences	:	Education	:
Engineering	: 30	Science	: 70
Engineering Design	:	Health	:
Social Sciences	:	Field	: 100

Weekly Detailed Course Contents			
Week	Topics	Study Materials	Materials
1	Tumors (Cell cycle, apoptosis, angiogenesis, metastasis)		
2	Antibody technologies		
3	Toxins and their effects		
4	Bioweapons		
5	Gene therapy		

Recommended Optional Programme Components	
MBT323 Molecular Biotechnology II	
MBT222 Molecular Biotechnology I	

Course Learning Outcomes	
No	Learning Outcomes
C01	Having substantial knowledge about biotechnological applications
C02	Having the ability to find solutions to current problems in biotechnology
C03	Having deep knowledge about gene therapy and protein engineering

Program Learning Outcomes	
No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	1	%40
Final examination	1	%40
Total		%100

	P01	P02	P03	P04	P05	P06	P07
All	5	5	5	5	3	4	4
C01	5	5	5	5	3	4	4
C02	5	5	5	5	3	4	4
C03	5	5	5	5	3	4	4



MBT332 Process Engineering for Biotechnology I					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
6	MBT332	Process Engineering for Biotechnology I	3	3	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

Having an understanding of industrial applications of biological processes.

Teaching Methods and Techniques:

Thermodynamics, bioreactors

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Associate Prof.Dr. Can Murat Ünal

Assistants:

Recommended or Required Reading	
Resources	Bioverfahrensentwicklung, Storch, Wiley-VCH Lecture notes

Course Category			
Mathematics and Basic Sciences	:	Education	:
Engineering	: 40	Science	: 60
Engineering Design	:	Health	:
Social Sciences	:	Field	: 100

Weekly Detailed Course Contents			
Week	Topics	Study Materials	Materials
1	Bioreactor design		
2	Kinetic models		
3	Transportsystems in bioreactors		
4	Multi-phase systems		
5	Modeling of bioprocesses		
6	Simulations with MATLAB		

Recommended Optional Programme Components	
PHY111 Physics I	
BIO111 Biology	
MBT204 Microbiology I	

Course Learning Outcomes	
No	Learning Outcomes
C01	Understanding working mechanisms of bioreactors
C02	Having an understanding of biological processes in industrial applications

Program Learning Outcomes	
No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%20	Course Duration	14	3	42
Quizzes	0	%0	Hours for off-the-c.r.stud	14	6	84
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	0	%0	Mid-terms	1	10	10
Project	1	%40	Practice	2	5	10
Final examination	1	%40	Laboratory	0	0	0
Total		%100	Project	1	20	20
			Final examination	0	0	0
			Total Work Load			166
			ECTS Credit of the Course			6

Contribution of Learning Outcomes to Programme Outcomes								
bbb								
	P01	P02	P03	P04	P05	P06	P07	
All	5	4	5	5	3	5	4	
C01	5	4	5	5	3	5	4	
C02	5	4	5	5	3	5	4	

NW1204 Measurement Techniques					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
6	NW1204	Measurement Techniques	3	4	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

Understand the theory of measurement, knowledge of sensors, Knowledge of methods of measuring different sizes, Group work ability for laboratory exercises

Teaching Methods and Techniques:

Introduction to metrology Measuring electrical quantities in theory and in practice Measuring non-electrical quantities in theory and in practice Understand the characteristics of transducers Digital metrology, Measurement error analysis and statistical evaluation, Static and dynamic behavior of measuring instruments

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Associate Prof.Dr. Tuba Çonka Yıldız

Assistants:

Research Assist. Mustafa Erkam Özates

Recommended or Required Reading

Resources

Heyne, Georg Elektronische Meßtechnik Eine Einführung für
angehende Wissenschaftler, OLDENBOURG
Wissenschaftsverlag GmbH, 1999 ISBN 3-486-24976-2 ISBN
978-3-486-24976-7
? F. Puente León: Messtechnik, Springer-Verlag, Berlin
Haidelhern 70116 ISBN 978-3-662-44870-5

Course Category

Mathematics and Basic Sciences	:		Education	:	
Engineering	:	80	Science	:	
Engineering Design	:		Health	:	
Social Sciences	:	20	Field	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to measurement technology		
2	Introduction to laboratory exercises and safety rules		
3	Metals and semiconductors		
4	Measuring electrical quantities		
5	Measuring electrical quantities		
6	Active and passive sensors		
7	Measuring non-electrical quantities		
8	Measuring non-electrical quantities		
9	Characteristics of the transducers		
10	Measuring circuits		
11	Midterm		
12	Discretization		
13	Digital measurement technology		
14	Measurement error and statistical evaluation		
15	Static and dynamic behavior of measuring instruments		

Course Learning Outcomes

No	Learning Outcomes
C01	Understand the theory of metrology
C02	Knowledge of sensors
C03	Ability of group work in the laboratory environment

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%30	Course Duration	14	1	14
Quizzes	0	%0	Hours for off-the-c.r.stud	10	5	50
Assignment	0	%0	Assignments	4	8	32
Attendance	0	%0	Presentation	0	0	0
Practice	14	%30	Mid-terms	1	0	0
Project	0	%0	Practice	14	2	28
Final examination	1	%40	Laboratory	0	0	0
Total		%100	Project	0	0	0
			Final examination	1	30	30
			Total Work Load			154
			ECTS Credit of the Course			5

Contribution of Learning Outcomes to Programme Outcomes								
bbb								
	P01	P02	P03	P04	P05	P06	P07	
All	5	5	5	5	5	5	5	

NW1300 Law					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
6	NW1300	Law	3	3	3

Mode of Delivery:

Face to Face

Language of Instruction:

Turkish

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

Having knowledge about fundamental principles of law and labor law. Telling the basic labor relations between workers and employers and collective labor relations through trade unions, and providing the basic knowledge of strike-lockout.

Teaching Methods and Techniques:

Basic principles governing labor law, contracts of employment, freedom of trade unions, strike-lockout

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Undefined Belirsiz

Assistants:

Recommended or Required Reading

Resources Ekmekçi, Ömer: Toplu İş Hukuku Dersleri, Beta Basım Yayım, İstanbul 2018, Sözek, Sarper: İş Hukuku, Beta Basım Yayım, İstanbul 2018

Course Category

Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	:
Engineering Design	:	Health	:
Social Sciences	: 100	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	The subject and qualifications of labor law, basic principles governing labor law, sources of labor law, basic concepts of lab		
2	Definition, elements and types of employment contract		
3	Making a contract of employment		
4	Debts arising from the employment contract		
5	arrangement of labour relations		
6	Termination of employment contract with termination notice, Job security		
7	Termination of employment contract for just cause		
8	Results of the termination of the employment contract		
9	The concept of worker and employer organizations		
10	freedom of trade unions		
11	Trade union establishment procedures and membership		
12	collective bargaining agreements		
13	making a collective bargaining contract		
14	Collective labor disputes, strike-lockout		

Course Learning Outcomes

No	Learning Outcomes
C01	To learn the purpose and content of individual and collective labor law
C02	To understand that labor law is founded on the basis of protection of workers and to interpret this principle correctly in business relations.
C03	To be able to differentiate the fundamental differences in the doctrine of labor law and to make different interpretations in various disputes
C04	To have an idea about the problems and solutions in practice

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%40	Course Duration	14	3	42
Quizzes	0	%0	Hours for off-the-c.r.stud	0	0	0
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	0	%0	Mid-terms	1	15	15
Project	0	%0	Practice	0	0	0
Final examination	1	%60	Laboratory	0	0	0
Total		%100	Project	0	0	0
			Final examination	1	25	25
			Total Work Load			82
			ECTS Credit of the Course			3

Contribution of Learning Outcomes to Programme Outcomes			
bbb			
	P03	P06	
C01	3	5	
C02	3	5	
C03	3	5	
C04	3	5	



MBT364 Bioanalytics					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
6	MBT364	Bioanalytics	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Turkish

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Having knowledge about instrumental analytics for biological samples

Teaching Methods and Techniques:

Protein identification, electrophoresis, protein-protein interactions, chromatographic and spectrographic methods,

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Associate Prof.Dr. Can Murat Ünal

Assistants:

Recommended or Required Reading

Resources	Bioanalytik, Lottspeich und Engels, Spektrum Verlag Lecture notes
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Course Category

Mathematics and Basic Sciences	:		Education	:	
Engineering	:	20	Science	:	80
Engineering Design	:		Health	:	
Social Sciences	:		Field	:	100

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Protein identification		
2	Spectrographic methods (UV-VIS, IR, Raman, Fluorescence)		
3	Electrophoresis		
4	Chromatographic methods		
5	Mass spectrometry		
6	Protein-protein interactions		
7	Biosensors		
8	Electron microscopy		

Recommended Optional Programme Components

NWI201 Physical Chemistry I

MBT211 Biochemistry I

Course Learning Outcomes

No	Learning Outcomes
C01	Having knowledge about instrumental analytics
C02	Working with biological samples

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	1	%40
Final examination	1	%40
Total		%100

Contribution of Learning Outcomes to Programme Outcomes							
bbb							
	P01	P02	P03	P04	P06	P07	
All	5	5	5	5	4	4	
C01	5	5	5	5	4	4	
C02	5	5	5	5	4	4	



NW1202 Physical Chemistry II					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
6	NW1202	Physical Chemistry II	4	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Building on a deep understanding of the subject, students should be able to: • to discuss the phase behavior of real systems, processes at electrodes, and chemical equilibria based on molecular and thermodynamic concepts. • Have a basic understanding of chemical kinetics and reaction dynamics. • to master the most important experimental techniques for the measurement and evaluation of physical-chemical quantities and processes.

Teaching Methods and Techniques:

Theory: reactions in water; Electrochemistry; reaction kinetics; Atmospheric chemistry. Practical course: Melting diagram of binary mixtures, pH-dependence of a solvolysis reaction, birefringence of light by nematic liquids, viscosity of liquids, heat of evaporation, cane sugar inversion, viscosity of gases, decomposition of diacetone alcohol, charge transport in electrolyte solutions, pH balance of buffer -lösungen, Nernst distribution set, mixing behavior of liquids.

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Asist Prof.Dr. Sibel Özenler

Assistants:

Recommended or Required Reading

Resources	G. Wedler: Lehrbuch der Physikalischen Chemie; VCH, 5. Aufl., 2004
	G. Wedler: Lehrbuch der Physikalischen Chemie; VCH, 5. Aufl., 2004
	Yardımcı Kaynaklar:
1.	P.W. Atkins: Physikalische Chemie; VCH-Wiley, 4. Aufl., 2006
2.	T Engel/P. Reid; Physikalische Chemie

Course Category

Mathematics and Basic Sciences	: 60	Education	:
Engineering	: 40	Science	:
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Foundations of reaction kinetics		
2	Basics, complex kinetics and approximation, activation energy and catalysis		
3	postulates of quantum mechanics, Schrödinger equation, simple quantum chemical models		
4	quantum-mechanical approximation, atomic structure		
5	chemical bond, electromagnetic spectrum		

Course Learning Outcomes

No	Learning Outcomes
C01	Building on a deep understanding of the subject, students should be able to discuss the phase behavior of real systems, processes at electrodes, and chemical equilibria based on molecular and the

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%20	Course Duration	14	2	28
Quizzes	0	%0	Hours for off-the-c.r.stud	14	9	126
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	1	%30	Mid-terms	1	2	2
Project	1	%10	Practice	0	0	0
Final examination	1	%40	Laboratory	14	1	14
Total		%100	Project	1	10	10
			Final examination	1	2	2
			Total Work Load			182
			ECTS Credit of the Course			6

Contribution of Learning Outcomes to Programme Outcomes			
bbb			
	P01	P02	
All	3	1	



MBT441 Project I					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
7	MBT441	Project I	0	4	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

To ensure that students develop their academic writing skills related to their profession, as well as paraphrase and abstract essay writing skills.

Teaching Methods and Techniques:

It aims to encourage students to write and classify their professional academic writing skills through brainstorming and use them directly in quotes, paraphrase and abstract essays by referring to resources as well as being organized. At the end of the course, the students are able to write two basic essay types based on the research results (Cause and Effect and Argumentative essays).

Prerequisites and co-requisites:

Course Coordinator:

Bölüm Başkanı Orkide Coskuner Weber

Name of Lecturers:

Assistants:

Recommended or Required Reading

Resources	Lecture Notes
	<ul style="list-style-type: none">New Headway Pre-IntermediateNew English File Pre-IntermediateLanguage Leader Pre-Intermediate

Course Category

Mathematics and Basic Sciences	:	Education	:	100
Engineering	:	Science	:	
Engineering Design	:	Health	:	
Social Sciences	:	Field	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Literature review and performing prestudies for the thesis		

Course Learning Outcomes

No	Learning Outcomes
C01	To ensure that students develop their academic writing skills related to their profession, as well as paraphrase and abstract essay writing skills.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	0	%0	Course Duration	14	1	14
Quizzes	0	%0	Hours for off-the-c.r.stud	14	6	84
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	0	%0	Mid-terms	0	0	0
Project	1	%100	Practice	0	0	0
Final examination	0	%0	Laboratory	14	4	56
Total		%100	Project	1	40	40
			Final examination	0	0	0
			Total Work Load			194
			ECTS Credit of the Course			6

Contribution of Learning Outcomes to Programme Outcomes		
bbb		
	P07	
C01	3	



Turkish-German University

Faculty of Science
Molecular Biotechnology (German)

07-02

PRK401 Internship					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
7	PRK401	Internship	0	0	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

Yes

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

Gaining practical skills

Teaching Methods and Techniques:

Internship at industry.

Prerequisites and co-requisites:**Course Coordinator:**

Bölüm Başkanı Orkide Coskuner Weber

Name of Lecturers:**Assistants:****Recommended or Required Reading****Resources**

Internship Regulations of Turkish German University (<http://www.tau.edu.tr/img/files/Fen%20Fak%C3%BCltesi%20Staj%20Y%C3%B6nergesi.pdf>)

Course Category

Mathematics and Basic Sciences	:	Education	:	
Engineering	:	Science	:	100
Engineering Design	:	Health	:	
Social Sciences	:	Field	:	100

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	İşyerinde 40 gün staj.		
2	Yapılan çalışmaların raporunun sunulması.		

Course Learning Outcomes**No Learning Outcomes**

C01 Having ability to use theoretical knowledge on experimental and practical applications.

Program Learning Outcomes**No Learning Outcome**

P06 Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07 Having knowledge about work occupational work and safety.
P02 Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05 Having computational skills for research data analysis purposes.
P01 Working with modern scientific sources.
P03 Having theoretical and practical skills in the area of biotechnology.
P04 Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	0	%0	Course Duration	0	0	0
Quizzes	0	%0	Hours for off-the-c.r.stud	0	0	0
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	0	%0	Mid-terms	0	0	0
Project	1	%100	Practice	0	0	0
Final examination	0	%0	Laboratory	0	0	0
Total		%100	Project	1	180	180
			Final examination	0	0	0
			Total Work Load			180
			ECTS Credit of the Course			6

Contribution of Learning Outcomes to Programme Outcomes								
bbb								
	P01	P02	P03	P04	P05	P06	P07	
C01	3	5	5	3	4	5	5	



Turkish-German University

Faculty of Science
Molecular Biotechnology (German)

07-03-01

MBT433 Process Engineering for Biotechnology II					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
7	MBT433	Process Engineering for Biotechnology II	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Having knowledge about applications of bioreactors in industrial processes.

Teaching Methods and Techniques:

Bioreactors, their design principles and scale-up methods. Model organisms for bioreactors and their metabolic processes. Modeling of cellular metabolism. Simulations with MATLAB.

Prerequisites and co-requisites:**Course Coordinator:****Name of Lecturers:**

Undefined Belirsiz

Assistants:

Recommended or Required Reading	
Resources	Bioverfahrensentwicklung, Storch, Wiley-VCH

Course Category			
Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	: 100
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents			
Week	Topics	Study Materials	Materials
1	Bioreactor design.		
2	Model organisms.		
3	Modeling metabolic processes.		
4	Simulations with MATLAB.		

Recommended Optional Programme Components	
NWI201 Physical Chemistry I	
MBT332 Process Engineering for Biotechnology I	
MBT204 Microbiology I	

Course Learning Outcomes	
No	Learning Outcomes
C01	Having an understanding of bioreactor design and model organisms.

Program Learning Outcomes	
No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%40	Course Duration	14	3	42
Quizzes	0	%0	Hours for off-the-c.r.stud	14	3	42
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	1	%20	Mid-terms	1	10	10
Project	0	%0	Practice	0	0	0
Final examination	1	%40	Laboratory	14	2	28
Total		%100	Project	0	0	0
			Final examination	1	10	10
			Total Work Load			132
			ECTS Credit of the Course			4

Contribution of Learning Outcomes to Programme Outcomes						
bbb						
	P01	P02	P03	P04	P06	
C01	5	5	5	5	5	



Turkish-German University

Faculty of Science
Molecular Biotechnology (German)

07-03-02

MBT471 Cell-Material Interactions					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
7	MBT471	Cell-Material Interactions	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutsch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Gaining knowledge about biocompatible materials and the possible interactions between materials and tissues.

Teaching Methods and Techniques:

Signal transduction in the skin and bones, biological matrices, biopolymers, material-tissue interactions, surface chemistry, inorganic materials and surfaces, organic polymers, biomaterials

Prerequisites and co-requisites:**Course Coordinator:****Name of Lecturers:**

Undefined Belirsiz

Assistants:

Recommended or Required Reading	
Resources	Tissue Engineering, van Blitterswijk, de Boer, Academic Press

Course Category			
Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	: 100
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents			
Week	Topics	Study Materials	Materials
1	Signal transduction in the skin and bones		
2	Biological matrices, extra cellular matrix		
3	Biopolymers		
4	Tissue-material interactions		
5	Surface chemistry and topology		
6	Mechanics of materials		
7	Inorganic materials and surfaces		
8	Organic polymers		
9	Biomaterials		
10	Matrix design and production		

Recommended Optional Programme Components	
CHE111 Chemistry I	
CHE112 Chemistry II	
MBT201 Cell Biology	

Course Learning Outcomes	
No	Learning Outcomes
C01	Gaining knowledge about material-tissue interactions and biocompatible materials.

Program Learning Outcomes	
No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	1	%20
Project	0	%0
Final examination	1	%40
Total		%100

ECTS Allocated Based on Student Workload			
Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	3	42
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	10	10
Practice	0	0	0
Laboratory	14	2	28
Project	0	0	0
Final examination	1	10	10
Total Work Load			132
ECTS Credit of the Course			4

Contribution of Learning Outcomes to Programme Outcomes						
bbb						
	P01	P02	P03	P04	P06	
C01	5	5	5	5	5	



Turkish-German University

Faculty of Science
Molecular Biotechnology (German)

07-03-03

MBT473 Tissue Engineering					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
7	MBT473	Tissue Engineering	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Gaining knowledge about processes to create functional tissues using biological and nonbiological materials to be used in medical applications.

Teaching Methods and Techniques:

Stem cell biology, tissue engineering, 3D cell culture, organoids, nanomaterials.

Prerequisites and co-requisites:**Course Coordinator:****Name of Lecturers:**

Undefined Belirsiz

Assistants:

Recommended or Required Reading	
Resources	Tissue Engineering, van Blitterswijk, de Boer, Academic Press

Course Category			
Mathmatics and Basic Sciences	:	Education	:
Engineering	:	Science	: 100
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents			
Week	Topics	Study Materials	Materials
1	Stem cell biology		
2	Tissue engineering		
3	3D cell culture		
4	Organoids		
5	Nanomaterials		

Recommended Optional Programme Components	
CHE111 Chemistry I	
CHE112 Chemistry II	
MBT201 Cell Biology	

Course Learning Outcomes	
No	Learning Outcomes
C01	Gaining knowledge about processes to create functional tissues using biological and nonbiological materials to be used in medical applications.

Program Learning Outcomes	
No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%40	Course Duration	14	3	42
Quizzes	0	%0	Hours for off-the-c.r.stud	14	3	42
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	1	%20	Mid-terms	1	10	10
Project	0	%0	Practice	0	0	0
Final examination	1	%40	Laboratory	14	2	28
Total		%100	Project	0	0	0
			Final examination	1	10	10
			Total Work Load			132
			ECTS Credit of the Course			4

Contribution of Learning Outcomes to Programme Outcomes						
bbb						
	P01	P02	P03	P04	P06	
C01	5	5	5	5	5	



Turkish-German University

Faculty of Science
Molecular Biotechnology (German)

07-03-04

MBT475 Biosensors					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
7	MBT475	Biosensors	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Having a knowledge about biosensors and biomimetic sensors.

Teaching Methods and Techniques:

Integration of biomolecules and synthetic molecules with electronic sensors and their applications to bioanalytics.

Prerequisites and co-requisites:**Course Coordinator:****Name of Lecturers:**

Undefined Belirsiz

Assistants:**Recommended or Required Reading**

Resources Biosensoren, Hall Elizabeth A.H.

Course Category

Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	: 100
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Biosensors.		
2	Biomimetic sensors.		
3	Immobilizing of enzymes and proteins.		
4	Measurement techniques, QCM, SPR, Electrochemistry		

Course Learning Outcomes

No	Learning Outcomes
C01	Gaining knowledge about biosensors and biomimetic sensors.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%40	Course Duration	14	3	42
Quizzes	0	%0	Hours for off-the-c.r.stud	14	3	42
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	1	%20	Mid-terms	1	10	10
Project	0	%0	Practice	0	0	0
Final examination	1	%40	Laboratory	14	2	28
Total		%100	Project	0	0	0
			Final examination	1	10	10
			Total Work Load			132
			ECTS Credit of the Course			4

Contribution of Learning Outcomes to Programme Outcomes							
bbb							
	P01	P02	P03	P04	P05	P06	
C01	5	5	5	5	2	5	



Turkish-German University

Faculty of Science
Molecular Biotechnology (German)

07-03-05

MBT477 Nanobiotechnology					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
7	MBT477	Nanobiotechnology	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Having knowledge about nanostructures in biological systems.

Teaching Methods and Techniques:

Characterization, production of nanomaterials and their applications in nanotechnology. Nanostructures in living systems.

Prerequisites and co-requisites:**Course Coordinator:****Name of Lecturers:**

Undefined Belirsiz

Assistants:

Recommended or Required Reading	
Resources	Biotechnologie für Einsteiger, Renneberger

Course Category			
Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	: 100
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents			
Week	Topics	Study Materials	Materials
1	Metalic nanoparticles.		
2	Graphene and carbon nanotubes.		
3	Quantum dots.		
4	Protein and DNA based structures.		
5	Bioelectronics, biosensors and biochips.		
6	Applications to cosmetics and medicine.		

Course Learning Outcomes	
No	Learning Outcomes
C01	Having knowledge about nanostructures in biological systems.

Program Learning Outcomes	
No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%40	Course Duration	14	3	42
Quizzes	0	%0	Hours for off-the-c.r.stud	14	3	42
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	1	%20	Mid-terms	1	10	10
Project	0	%0	Practice	0	0	0
Final examination	1	%40	Laboratory	14	2	28
Total		%100	Project	0	0	0
			Final examination	1	10	10
			Total Work Load			132
			ECTS Credit of the Course			4

Contribution of Learning Outcomes to Programme Outcomes								
bbb								
	P01	P02	P03	P04	P05	P06	P07	
C01	5	5	5	5	3	5	1	



MBT479 Targeted Drug Delivery					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
7	MBT479	Targeted Drug Delivery	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Gaining knowledge about up-to-date research areas in targeted drug delivery designs.

Teaching Methods and Techniques:

Therapies for cancer and infectious diseases, vaccine technologies, nucleic acid based drugs, targeted delivery, bacterial and viral vectors, nanocarriers and nanoparticles

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Undefined Belirsiz

Assistants:

Recommended or Required Reading

Resources Cancer Targeted Trug Delivery, Springer Verlag, Targeted Drug Delivery : Concepts and Design, Springer Verlag, Multifunctional Nanoparticles for Drug Delivery Application

Course Category

Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	: 100
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Therapies for cancer and infectious diseases		
2	Targeted delivery methods		
3	Vaccine technologies		
4	Nucleic acid based drugs		
5	Bacterial and viral vectors		
6	Nacocarriers and nanoparticles		

Course Learning Outcomes

No	Learning Outcomes
C01	Gaining knowledge about up-to-date research areas in targeted drug delivery designs.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	1	%20
Project	0	%0
Final examination	1	%40
Total		%100

ECTS Allocated Based on Student Workload			
Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	3	42
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	10	10
Practice	0	0	0
Laboratory	14	2	28
Project	0	0	0
Final examination	1	10	10
Total Work Load			132
ECTS Credit of the Course			4

Contribution of Learning Outcomes to Programme Outcomes						
bbb						
	P01	P02	P03	P04	P06	
C01	5	5	5	5	5	



Turkish-German University

Faculty of Science
Molecular Biotechnology (German)

07-04-01

MBT451 Bioinformatics					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
7	MBT451	Bioinformatics	2	4	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Providing students with knowledge and experience about tumor formation and modern therapy methods.

Teaching Methods and Techniques:

Biotechnology III examines tumor formation, modern therapies, gene therapy, bacterial diseases, toxins and biological weapons and provides brief information on biotechnology. Molecular basis of tumor formation (DNA exchange, cell cycle, apoptosis, angiogenesis, metastasis formation, tumor stem cells) Modern therapy applications (Antibody technology, alternative scaffolds, therapeutic peptides) Toxins and their effects Biological weapons Gene therapy

Prerequisites and co-requisites:**Course Coordinator:****Name of Lecturers:**

Asist. Prof. Dr. Neşe Aral

Assistants:**Recommended or Required Reading**

Resources	Structural Bioinformatics, Forbes J. Burkowski D. Clark, N. Pazdernik, Molekulare Biotechnologie: Grundlagen und Anwendungen
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Course Category					
Mathematics and Basic Sciences	:		Education	:	
Engineering	:	0	Science	:	50
Engineering Design	:		Health	:	
Social Sciences	:		Field	:	50

Weekly Detailed Course Contents			
Week	Topics	Study Materials	Materials
1	Protein Yapısı		
2	Protein veritabanları, PDB dosya formatı		
3	İkili dizi karşılaştırma ve skor matrisleri		
4	Protein yapısının karşılaştırılması		
5	PyMol ve BioPython Programlarına giriş		

Course Learning Outcomes	
No	Learning Outcomes
C01	Having knowledge about biological databases.
C02	Being able to use bioinformatical tools to make proteomic and genomic analysis.

Program Learning Outcomes	
No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%40	Course Duration	14	2	28
Quizzes	0	%0	Hours for off-the-c.r.stud	7	10	70
Assignment	0	%0	Assignments	4	10	40
Attendance	0	%0	Presentation	1	10	10
Practice	0	%0	Mid-terms	1	2	2
Project	0	%0	Practice	0	0	0
Final examination	1	%60	Laboratory	14	2	28
Total		%100	Project	0	0	0
			Final examination	1	2	2
			Total Work Load			180
			ECTS Credit of the Course			6

Contribution of Learning Outcomes to Programme Outcomes				
bbb				
	P01	P02	P03	
C01	1	2	3	



MBT453 Biomathematics					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
7	MBT453	Biomathematics	4	4	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Gaining the ability to use mathematical models to understand biological phenomena.

Teaching Methods and Techniques:

Biological networks, differential equations, game theory, random walks.

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Asist Prof.Dr. Neşe Aral

Assistants:

Recommended or Required Reading

Resources Mathematical Biology, Roland W. Shonkwiler, James Herod

Course Category

Mathematics and Basic Sciences	:	100	Education	:	
Engineering	:		Science	:	100
Engineering Design	:		Health	:	
Social Sciences	:		Field	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Differential equations		
2	Population dynamics		
3	HIV infection model		
4	Biological networks		
5	Information theory and genomes		
6	Random walk		
7	Lotka-Volterra systems, game theory, Nash equilibria and evolution		

Course Learning Outcomes

No Learning Outcomes

C01 Having the ability to construct mathematical models for biological systems.

Program Learning Outcomes

No Learning Outcome

P06 Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07 Having knowledge about work occupational work and safety.
P02 Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05 Having computational skills for research data analysis purposes.
P01 Working with modern scientific sources.
P03 Having theoretical and practical skills in the area of biotechnology.
P04 Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%40	Course Duration	14	2	28
Quizzes	0	%0	Hours for off-the-c.r.stud	14	3	42
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	0	%0	Mid-terms	1	15	15
Project	1	%20	Practice	14	2	28
Final examination	1	%40	Laboratory	0	0	0
Total		%100	Project	1	20	20
			Final examination	1	15	15
			Total Work Load			148
			ECTS Credit of the Course			5

Contribution of Learning Outcomes to Programme Outcomes							
bbb							
	P01	P02	P03	P04	P05	P06	
C01	4	5	5	5	5	5	



Turkish-German University

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Molecular Biotechnology (German)

07-04-03

MBT455 Biophysics					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
7	MBT455	Biophysics	4	4	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Having an understanding of the role of concepts and methods in physical sciences in explaining working principles of biological systems.

Teaching Methods and Techniques:

Molecular structures and forces, cell structure, cell mechanics, transport through membranes diffusion, energy and thermodynamics in biological systems, fluids in biological systems: life at low Reynolds numbers, blood circulation. Electromagnetic concepts: neurobiophysics, radiation. Structural analyses: Microscopy, electron microscopy, NMR, X-Ray imaging.

Prerequisites and co-requisites:**Course Coordinator:****Name of Lecturers:**

Asist. Prof. Dr. Neşe Aral

Assistants:**Recommended or Required Reading**

Resources Biophysik, Werner Mänteke, Angewandte Biophysik, Helmut Pfützner, Lehrbuch der Biophysik, Erich Sackmann, Rudolf Merkel

Course Category

Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	: 100
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Molecular structure and forces. Protein structure and folding.		
2	Cell structure and cell mechanics.		
3	Membranes, permeability, diffusion.		
4	Energy and thermodynamic processes in biological systems.		
5	Fluids in biological systems, life at low Reynolds numbers.		
6	Blood circulation		
7	Electromagnetic concepts: Neurobiophysics		
8	Radiation and its effects on living systems		
9	Photosynthesis		
10	Self organization in the cell		
11	Biomechanics		
12	Structural analyses: Microscopy, electron microscopy		
13	NMR and X-ray imaging		
14	What is Life, Erwin Schrödinger		

Recommended Optional Programme Components

PHY111 Physics I

BIO111 Biology

PHY112 Physics II

MAT201 Differential Equations

Course Learning Outcomes

No	Learning Outcomes
C01	Biyolojik sistemleri açıklamada fizik biliminden yararlanabilme.
C02	Biyolojik sistemler için matematiksel modelleme yapabilme.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%40	Course Duration	14	2	28
Quizzes	0	%0	Hours for off-the-c.r.stud	14	3	42
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	0	%0	Mid-terms	1	15	15
Project	1	%20	Practice	14	2	28
Final examination	1	%40	Laboratory	0	0	0
Total		%100	Project	1	30	30
			Final examination	1	15	15
			Total Work Load			158
			ECTS Credit of the Course			5

Contribution of Learning Outcomes to Programme Outcomes							
bbb							
	P01	P02	P03	P04	P05	P06	
C01	5	5	5	5	3	4	
C02	5	5	5	5	3	4	



Project II (Graduation Project)					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
8	MBT442	Project II (Graduation Project)	0	6	12

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Required

Objectives of the Course:

To provide the student with the ability to analyze the problem/system with which he/she is dealing and to develop solution ideas considering theoretical knowledge. To provide a useful experience through a self study to take the first step to his/her new career which will start after graduation. The student will communicate his/her study efficiently, verbal and written, so he/she will learn to express himself/herself better.

Teaching Methods and Techniques:

I. To provide the student with the ability to analyze the problem/system with which he/she is dealing and to develop solution ideas considering theoretical knowledge. II. To provide a useful experience through a self study to take the first step to his/her new career which will start after graduation. III. The student will communicate his/her study efficiently, verbal and written, so he/she will learn to express himself/herself better.

Prerequisites and co-requisites:

Course Coordinator:

Bölüm Başkanı Orkide Coskuner Weber

Name of Lecturers:

Assistants:

Recommended or Required Reading	
Resources	Scientific Journals and Books related to the field Will be disseminated to the students in digital form

Course Category			
Mathematics and Basic Sciences	:	Education	:
Engineering	: 40	Science	:
Engineering Design	: 40	Health	:
Social Sciences	:	Field	: 20

Weekly Detailed Course Contents			
Week	Topics	Study Materials	Materials
1	Selected study topics in the application areas of Material Science- Product development / R&D- Materials and process devel		
2	Selected study topics in the application areas of Material Science- Product development / R&D- Materials and process devel		
3	Designing the instruments/tools etc. to achieve the objective / formulating solution alternatives		
4	Designing the instruments/tools etc. to achieve the objective / formulating solution alternatives		
5	Designing the instruments/tools etc. to achieve the objective / formulating solution alternatives		
6	Evaluate alternatives (use the relevant background data) and choose a solution		
7	Evaluate alternatives (use the relevant background data) and choose a solution		
8	Implementation of the solution (optional)		
9	Implementation of the solution (optional)		
10	Implementation of the solution (optional)		
11	Discussion of the results and implications (global, economic,social, environmental) of your III solution		
12	Discussion of the results and implications (global, economic,social, environmental) of your III solution		
13	Report the study and the findings		
14	Present the study and the findings		

Course Learning Outcomes	
No	Learning Outcomes
C01	Formulate and analyze a problem by examining the current status
C02	Develop applicable suggestions and/or solution methods for the problem dealt with, considering theoretical knowledge.
C03	Gain the ability to implement a solution method to an existing problem and will be able to evaluate the results.
C04	Learn to express himself/herself by reporting and presenting the work.
C05	Learn to defend the idea that underlines the results of the study.

Program Learning Outcomes	
No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	0	%0	Course Duration	14	4	56
Quizzes	0	%0	Hours for off-the-c.r.stud	14	16	224
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	1	35	35
Practice	0	%0	Mid-terms	0	0	0
Project	1	%100	Practice	0	0	0
Final examination	0	%0	Laboratory	0	0	0
Total		%100	Project	0	0	0
			Final examination	1	40	40
			Total Work Load			355
			ECTS Credit of the Course			12

Contribution of Learning Outcomes to Programme Outcomes								
bbb								
	P01	P02	P03	P04	P05	P06	P07	
All	5	5	5	5	5	5	5	



MBT474 Population Genetics					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
8	MBT474	Population Genetics	5	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Having an understanding of basic principles and applications of population genetics.

Teaching Methods and Techniques:

Hardy-Weinberg Laws and their applications, genetic drift and effective populations size, population structure, natural selection, molecular evolution

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Associate Prof.Dr. Can Murat Ünal

Assistants:

Recommended or Required Reading

Resources Population Genetics, 2009. Matthew B. Hamilton. Wiley-Blackwell, UK.

Course Category

Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	: 100
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Genotype frequencies: Hardy-Weinberg Laws and their applications.		
2	Fixation index		
3	Genetic drift and effective population size.		
4	Models of natural selection		
5	Molecular evolution		
6	Quantitative trait variation and evolution		

Course Learning Outcomes

No	Learning Outcomes
C01	To be able to understand effects of mutation, drift, selection and population size on the genetic changes in a population.
C02	Being able to make statistical analyses of data encountered in population genetics and phylogenetics.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%40	Course Duration	14	3	42
Quizzes	0	%0	Hours for off-the-c.r.stud	14	2	28
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	0	%0	Mid-terms	1	15	15
Project	0	%0	Practice	14	2	28
Final examination	1	%60	Laboratory	0	0	0
Total		%100	Project	0	0	0
			Final examination	1	15	15
			Total Work Load			128
			ECTS Credit of the Course			4

Contribution of Learning Outcomes to Programme Outcomes							
bbb							
	P01	P02	P03	P04	P05	P06	
C01	5	5	5	5	3	5	
C02	5	5	5	5	3	5	



MBT476 Active Agent Research					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
8	MBT476	Active Agent Research	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutsch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Gaining knowledge about research processes in pharmacology, pharmacodynamics and pharmacokinetics.

Teaching Methods and Techniques:

Drug classification and drug action mechanisms, active agent design, clinical applications

Prerequisites and co-requisites:**Course Coordinator:****Name of Lecturers:**

Undefined Belirsiz

Assistants:**Recommended or Required Reading****Resources** Pharmakologie und Toxikologie: Arzneimittelwirkungen verstehen, Lüllmann, Mohr und Hein, George Thieme Verlag

Course Category			
Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	: 100
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents			
Week	Topics	Study Materials	Materials
1	Drug classification and drug action mechanisms		
2	Clinical pictures		
3	Working mechanisms of central nervous system, circulatory system and liver		
4	Active agent design		
5	Pharmacodynamics, pharmacokinetics		
6	Clinical studies		

Recommended Optional Programme Components

MBT201 Cell Biology

Course Learning Outcomes**No Learning Outcomes**

C01 Gaining knowledge about research processes in pharmacology, pharmacodynamics and pharmacokinetics.

Program Learning Outcomes**No Learning Outcome**

P06 Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.

P07 Having knowledge about work occupational work and safety.

P02 Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.

P05 Having computational skills for research data analysis purposes.

P01 Working with modern scientific sources.

P03 Having theoretical and practical skills in the area of biotechnology.

P04 Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%40	Course Duration	14	3	42
Quizzes	0	%0	Hours for off-the-c.r.stud	14	3	42
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	1	%20	Mid-terms	1	10	10
Project	0	%0	Practice	0	0	0
Final examination	1	%40	Laboratory	14	2	28
Total		%100	Project	0	0	0
			Final examination	1	10	10
			Total Work Load			132
			ECTS Credit of the Course			4

Contribution of Learning Outcomes to Programme Outcomes							
bbb							
	P01	P02	P03	P04	P05	P06	
C01	5	5	5	5	3	5	



Turkish-German University

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Molecular Biotechnology (German)

08-02-03

MBT478 Natural Substance Production					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
8	MBT478	Natural Substance Production	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Having an understanding of the methods used to modify bacterial and plant metabolisms to produce desired substances efficiently.

Teaching Methods and Techniques:

Production and industrial applications of hydrolases, oxidoreductases, transferases, isomerases, lyases and ligases with biocatalytic reactions.

Prerequisites and co-requisites:**Course Coordinator:****Name of Lecturers:**

Undefined Belirsiz

Assistants:**Recommended or Required Reading**

Resources K. Faber, Biotransformations in Organic Chemistry, Springer, 6. Auflage, Springer Verlag

Course Category

Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	: 100
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Bioanalytic reactions, hydrolases.		
2	Oxidoreductases, transferases.		
3	Isomerases, Lyases, Ligases.		
4	Immobilization techniques		
5	Biotechnological production of citric acid.		
6	Biotechnological production of Glucono-delta-lacton and glutamic acid.		

Course Learning Outcomes**No Learning Outcomes**

C01 Bakteri ve bitki hücresinde metabolizmayı değişiklik yaparak verimli şekilde ürün elde etme teknikleri hakkında bilgi sahibi olma.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%40	Course Duration	14	3	42
Quizzes	0	%0	Hours for off-the-c.r.stud	14	3	42
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	1	%20	Mid-terms	1	10	10
Project	0	%0	Practice	0	0	0
Final examination	1	%40	Laboratory	14	2	28
Total		%100	Project	0	0	0
			Final examination	1	10	10
			Total Work Load			132
			ECTS Credit of the Course			4

Contribution of Learning Outcomes to Programme Outcomes						
bbb						
	P01	P02	P03	P04	P06	
C01	5	5	5	5	5	



MWT310 Biomaterials					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
8	MWT310	Biomaterials	3	5	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

The students gain knowledge about the general principles for the description of physico-chemical contexts. They understand the basics of chemical and electrochemical equilibria and can apply them to different reactions. They are capable of independently performing and evaluating physical-chemical experiments.

Teaching Methods and Techniques:

Biological materials and biomineralization, structure-property relationships of selected biological materials, with particular emphasis on mechanical properties and the influence of hierarchy, bioactive, biodegradable, bioinert materials, acceptance / repulsion of implants, host response / immune response, wound healing, biomaterials, bioceramics, Biopolymers and Biocomposites, Selected Examples of Bioinspired Material Research; Dental and implant materials, drug delivery systems, 3D biomaterials printing

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Asist Prof.Dr. Duygu Ekinici

Assistants:

Recommended or Required Reading

Resources	
1.	Hench, L. L., J. R. Jones und M. B. Fenn, New Materials and Technologies For Healthcare, Imperial College Press.
2.	Schmidt, R., Werkstoffverhalten in biologischen Systemen: Grundlagen, Anwendungen, Schädigungsmechanismen, Werkstoffprüfung, 2. Auflage, Springer
3.	Eppler, M., Biomaterialien und Biomineralisation: Eine Einführung für Naturwissenschaftler, Mediziner und Ingenieure, Vieweg+Teubner.
4.	Wintermantel, E. und H.-W. Ha, Medizintechnik mit biokompatiblen Werkstoffen und Verfahren, Springer.
5.	Temenoff, J. S. und A. G. Mikos, Biomaterials: The Intersection of Biology and Materials Science, Prentice-Hall.
6.	Hench L. L. und J. R. Jones, Biomaterials, Artificial Organs and Tissue Engineering, Woodhead Publishing.

Course Category

Mathematics and Basic Sciences	:		Education	:	
Engineering	:	100	Science	:	
Engineering Design	:		Health	:	
Social Sciences	:		Field	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to biomaterials, biomaterials engineering and processing -		
2	Properties of materials		
3	Surface properties and surface characterization of materials		
4	Bioceramics		
5	Hydrogels		
6	Smart Polymer systems		
7	Composites in biomedical applications		
8	Natural materials		
9	Metals		
10	Testing of Biomaterials - Biocompatibility		

Course Learning Outcomes

No	Learning Outcomes
C01	The students gain knowledge about the general principles for the description of physico-chemical contexts.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%40	Course Duration	14	3	42
Quizzes	0	%0	Hours for off-the-c.r.stud	14	3	42
Assignment	0	%0	Assignments	1	10	10
Attendance	0	%0	Presentation	0	0	0
Practice	0	%0	Mid-terms	1	3	3
Project	0	%0	Practice	14	3	42
Final examination	1	%60	Laboratory	0	0	0
Total		%100	Project	0	0	0
			Final examination	1	3	3
			Total Work Load			142
			ECTS Credit of the Course			5

Contribution of Learning Outcomes to Programme Outcomes			
bbb			
	P02	P03	
C01	2	3	



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08-03-01

MBT456 Quantitative Biology					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
8	MBT456	Quantitative Biology	4	4	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Being able to use mathematical and computational methods to understand biological systems.

Teaching Methods and Techniques:

Ordinary and partial differential equations, stochasticity in biochemical reactions, Monte Carlo Analysis, molecular simulation, biological networks

Prerequisites and co-requisites:**Course Coordinator:****Name of Lecturers:**

Asist Prof.Dr. Neşe Aral

Assistants:**Recommended or Required Reading**

Resources Quantitative Biology, Brian Munsky et al.

Course Category

Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	: 100
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Ordinary and partial differential equations.		
2	Modeling with differential equaltons.		
3	Stochasticity in biochemical reactions.		
4	Kinetic Monte Carlo analysis.		
5	Molecular simulation.		
6	Biological networks.		

Course Learning Outcomes**No Learning Outcomes**

C01 Being able to use mathematical and computational tools to understand biological systems.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		%100

ECTS Allocated Based on Student Workload			
Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	14	3	42
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	15	15
Practice	14	2	28
Laboratory	0	0	0
Project	0	0	0
Final examination	1	15	15
Total Work Load			128
ECTS Credit of the Course			4

Contribution of Learning Outcomes to Programme Outcomes								
bbb								
	P01	P02	P03	P04	P05	P06	P07	
C01	4	5	3	5	5	3	1	



Turkish-German University

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Molecular Biotechnology (German)

08-03-02

MBT458 Biostatistics					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
8	MBT458	Biostatistics	4	4	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Gaining knowledge about fundamental methods and tools of statistics through the applications to the biological problems.

Teaching Methods and Techniques:

Collecting and classifying data, sampling methods, statistical hypothesis testing

Prerequisites and co-requisites:**Course Coordinator:****Name of Lecturers:**

Asist. Prof. Dr. Neşe Aral

Assistants:**Recommended or Required Reading**

Resources Biostatistik, Matthias Rudolf, Wiltrud Kuhlisch

Course Category

Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	: 100
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Data collection and spesification		
2	Theory of probability		
3	Frequency distribution		
4	Hypothesis testing, t-test		
5	Hypothesis testing, Chi-square test		
6	Correlation analysis		
7	Variance analysis		
8	Nonparametric methods		
9	Demography		
10	Numerical taxonomy		

Course Learning Outcomes

No	Learning Outcomes
C01	Temel istatistiksel sorunları çözebilme ve yorumlayabilme becerisinin kazanılması.
C02	Bilimsel araştırmalarda kullanılan temel istatistik tekniklerini anlayabilme.

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		%100

Contribution of Learning Outcomes to Programme Outcomes						
bbb						
	P01	P02	P03	P04	P05	P06
C01	4	5	5	5	5	5
C02	5	5	5	5	4	5



Turkish-German University

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Molecular Biotechnology (German)

08-03-03

Statistics and Numerical Methods					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
8	NWI302	Statistics and Numerical Methods	4	4	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Students will gain an understanding of the finite element and the finite differential methods.

Teaching Methods and Techniques:

Basics: Finite Element Method Applications: Thermal and mechanical stress of materials in the structure and around Cavities

Prerequisites and co-requisites:**Course Coordinator:****Name of Lecturers:****Assistants:****Recommended or Required Reading****Resources**

G. Müller, C. Groth; „FEM für Praktiker - Band 1: Grundlagen“; Expert Verlag (2000).

Course Category

Mathematics and Basic Sciences	:	100	Education	:
Engineering	:		Science	:
Engineering Design	:		Health	:
Social Sciences	:		Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Matematiksel Temeller, Bilgisayar uygulaması		
2	Method of finite differences		
3	Monte Carlo simulation		
4	calculation of electric fields		

Course Learning Outcomes

No	Learning Outcomes
C01	Gaining an understanding of the finite element and the finite differential methods

Program Learning Outcomes

No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		%100

	P01	P02	P03	P04	P05	P06	P07
All	5	5	5	5	5	5	5



NW1402 MATLAB for Biosciences					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
8	NW1402	MATLAB for Biosciences	2	4	6

Mode of Delivery:

Face to Face

Language of Instruction:

Deutsch

Level of Course Unit:

Bachelor's Degree

Work Placement(s):

No

Department / Program:

Molecular Biotechnology (German)

Type of Course Unit:

Elective

Objectives of the Course:

Having an understanding of programming concepts to make mathematical models of biological systems and being able to make applications on MATLAB

Teaching Methods and Techniques:

Differential equations: Population dynamics, predator-prey model, Michaelis-Menten kinetics, epidemic models. Image processing: Cell counting. Stochasticity: Diffusion, oxygen transport. Genetics: Sequence alignment, construction of phylogenetic trees. Neurophysiology: Synaptic transmission. Cellular automata.

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Asist. Prof. Dr. Neşe Aral

Assistants:

Recommended or Required Reading

Resources Mathematical Biology, Roland W. Shonkwiler, James Herod

Course Category			
Mathematics and Basic Sciences	:	Education	:
Engineering	:	Science	: 100
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents			
Week	Topics	Study Materials	Materials
1	Differential equations: Population Dynamics		
2	Predator-prey model		
3	Enzyme kinetics: Michaelis-Menten equation		
4	Epidemic models		
5	Image processing: Cell counting		
6	Stochasticity: Diffusion, oxygen transport		
7	Genetics: Sequence alignment, construction of phylogenetic trees		
8	Neurophysiology: Synaptic transmission		

Course Learning Outcomes	
No	Learning Outcomes
C01	Biyolojik sistemler için bilgisayar yardımı ile matematiksel modeller yapabilmek.

Program Learning Outcomes	
No	Learning Outcome
P06	Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.
P07	Having knowledge about work occupational work and safety.
P02	Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.
P05	Having computational skills for research data analysis purposes.
P01	Working with modern scientific sources.
P03	Having theoretical and practical skills in the area of biotechnology.
P04	Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.

Assessment Methods and Criteria			ECTS Allocated Based on Student Workload			
In-Term Studies	Quantity	Percentage	Activities	Quantity	Duration	Total Work Load
Mid-terms	1	%40	Course Duration	14	2	28
Quizzes	0	%0	Hours for off-the-c.r.stud	14	3	42
Assignment	0	%0	Assignments	0	0	0
Attendance	0	%0	Presentation	0	0	0
Practice	0	%0	Mid-terms	1	15	15
Project	1	%20	Practice	14	0	0
Final examination	1	%40	Laboratory	14	2	28
Total		%100	Project	1	20	20
			Final examination	1	15	15
			Total Work Load			148
			ECTS Credit of the Course			5

Contribution of Learning Outcomes to Programme Outcomes							
bbb							
	P01	P02	P03	P04	P05	P06	
C01	4	5	5	5	5	5	